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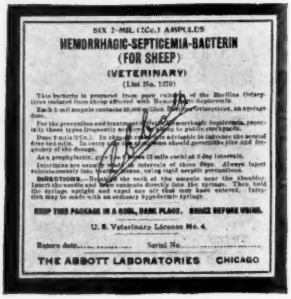
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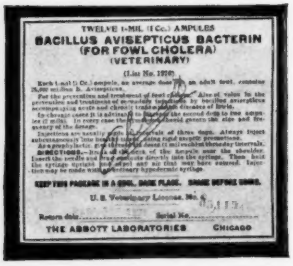
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VOL. XV. JUNE, 1920 NO. 6

Malignant Edema in Swine

By FR. PROESCHER and H. A. HOFFMAN, Sioux City, Iowa
Research Laboratories of the Purity Biological Laboratories

DURING the summer months of 1919, we observed a large number of pigs which became very sick after simultaneous vaccination with hog cholera serum and virus. Ten to fifteen hours after inoculation they exhibited swellings of a marked edematous character. A clinical diagnosis of hemorrhagic septicemia was at first made in these cases. However, the post-mortem findings of the first two pigs dying from this infection convinced us that we were not dealing with hemorrhagic septicemia, but with malignant edema.

According to the literature it would appear that malignant edema seldom occurs in swine, but our experience with these and other later cases indicates that it is more prevalent than is usually recognized. Shortly after our first experience with the disease, we saw a number of cases in the Sioux City stockyards, of pigs dying of malignant edema immediately following simultaneous vaccination. We have also examined a few cases which were sent to us from the killing floor of one of the largest packing houses in Sioux City, as well as a single spontaneous case which occurred after a wound infection. During the last two months another outbreak immediately following vaccination was reported to us from Nebraska. The diagnosis was confirmed by bacteriological examination. From a number of veterinarians with whom we discussed the disease, we learn that malignant edema in swine has usually been diagnosed as a form of septicemia of unknown etiology.

Malignant edema was first described in 1878 by Pasteur, and in 1881 it was thoroughly investigated by R. Koch. The micro-organism isolated was designated as *vibrio septique* (Pasteur) or *Bacillus oedematis maligni* (Koch).

More exhaustive studies of this particular disease within the last ten years led to the differentiation of two different clinical entities which are pathologically and etiologically different. The one group called gas phlegmon is very common in man but is of little interest to the veterinarian. The other group, malignant edema, affects lower animals almost exclusively.

Von Hibler, Gohn, Sachs and Novy have shown that malignant edema is caused by at least two biologically different, but microscopically similar micro-organisms.

Of the domestic animals, the horse seems to be the most susceptible to malignant edema, while in cattle and sheep, the disease is very rare. Cases in sheep following shearing have been reported.

So far, the disease in swine has received little attention.

Malignant Outbreak in Serum Plant

The following is a brief history of an outbreak of malignant edema observed in our serum plant. Pigs from Arkansas were used in testing several serials of serum for potency. Several pigs in each test became very lame and showed marked depression with loss of appetite. They developed swellings near the point of inoculation, either near the point where the virus was injected or on the opposite side. The infiltration was either confined to the throat and neck regions or extended over the entire shoulder region. The pigs so affected died within two or or three days. In all, about three hundred pigs died with this trouble.[1] A complete autopsy was performed on about fifteen animals. A description of the lesions found in one of the animals will exemplify the pathological changes found in all the animals posted.

The left side of the neck and the left shoulder were extremely swollen and finger impressions remained for sometime. On opening the edematous areas, a great mass of dark violet, putrefactive material having the odor of isobutyric acid, was found. The subcutaneous connective and fat tissues were very edematous and of a hemorrhagic gelatinous appearance.[2] The muscular tissue was intensely hemorrhagic and almost liquefied. The lymph-glands of this region were gray white, swollen, edematous and contained many punctiform hemorrhages throughout the lymphatic substance. On sectioning the deeper sutures of the left shoulder, the hemorrhagic edema was found to extent into the axillary region and a part of the thoracic and abdominal region was involved. The lungs were light pink in color; on section, fluffy, slighly edematous and congested. The heart showed a marked parenchymatous degeneration. The myocardium was very friable, easily torn and of a parboiled appearance. On opening the abdominal cavity, about 500 cc. of a clear yellow exudate escaped. The liver was swollen, friable and pale gray. A few irregularly outlined hemorrhagic areas were seen on the surface. The spleen was not enlarged but was dark red in color and of a firm consistency. The kidneys were brownish red, showing a few isolated petechiae. On section, the cortex was seen to be enlarged, gray brown and cloudy. The gastro-intestinal canal was free from any noticeable lesions. The gastric lymph-glands were swollen and deeply hemorrhagic. The urinary bladder contained about 400 cc. of a clear yellow urine. The mucous membrane was slightly swollen and congested.

Smears made from the edematous exudate and necrotic muscle tissue and stained by Gram's method and counterstained with fuchsin, showed a large number of bacilli which were irregular in size and shape; some were short and thick, others long and slender. Some of these organisms were Gram positive, other Gram negative. In smears made from animals which had been dead for some time we found a great many round or oval spores but very few bacilli. In the hanging drop or with dark field illumination, the bacilli were decidedly motile. After considering the symptoms exhibited by the animals, the lesions and microscopical findings, we made a diagnosis of malignant edema.

From the exudate, a strictly anaerobic micro-organism could be cultivated. Inoculation of these cultures into pigs, guinea pigs, rabbits, mice, rats, chickens and pigeons produced typical malignant edema. Smears and cultures taken from the inoculated animals showed the same organisms. The micro-organism isolated was a bacillus varying from 2 to 12 microns in length and from 1 to 1.5 microns in width. The average length was about 5.5 microns. It forms long filaments on the peritoneal and liver surface, varying in length from 35 to 120 microns. The micro-organism forms spores which are of a more uniform size and are oval shaped. The average length of spores is about 1.9 microns and the width 1.5 mi-

[1]About the same time that the pigs from Arkansas were dying of malignant edema, other pigs from Colorado were inoculated with the same serum and virus as was used on the Arkansas pigs, but none of the Colorado pigs developed the disease.

[2]It might be of interest to note that cases of this disease in which these edematous swellings were absent have been found on the killing floor of packing houses. They were of a chronic type in the form of abscesses. The inspectors have been diagnosing these conditions as a form of septicemia. In some of these specimens which were brought to our laboratory for diagnosis, the tissues immediately surrounding the abscessed areas contained a large number of malignant edema organisms.

	B. Edematis Maligni Koch	B. Edematis Maligni Gohn-Sachs	B. Edematis Maligni Novy II	B. Edematis Maligni Proescher-Hoffman
Resistance Spores to heat 100°.	150 Min.	6 Min.	180 Min. (not killed)	120 Min.
Milk	Coagulated Peptonized Gas formed in 24 to 48 hours	Coagulated Not peptonized Gas formed in 24 to 48 hours	Coagulated Not peptonized Gas formed in 24 to 48 hours	Coagulated Not peptonized Gas formed
Coagulated Serum	Liquefied	Not liquefied	.....	Liquefied
Brain Liver Media.	Blackened	Unchanged	Unchanged	Unchanged
Peptonization of Muscle.	Peptonized	Unchanged	.....	Peptonized
Character of Edema.	Hemorrhagic	Serous	Serous	Hemorrhagic
Motility	Motile	Motile	Motile	Motile
Formation of Filaments.	Marked	Marked	Marked	Marked

crons. The resistance of the spores to steaming and the more important cultural characteristics of the present known varieties of the malignant edema group are given in the following table:

From the above table it is evident that the organism isolated by us represents a new variety.[3]

The rapid course of the disease and the marked degenerative changes of the organs indicated the formation of a toxin by this micro-organism. We, therefore, filtered the exudate collected from the pigs which had died of the disease, using a Mandler filter. The sterile filtrate was inoculated into guinea pigs, rabbits, mice, rats, pigeons and sparrows. All these animals died from the subcutaneous injection of the filtrate. The fatal dose varied from .01 in the rabbit to .001 cc. in the mouse. Pathological changes in the animals dying from the effect of the toxin were similar to those produced by the injection of the living micro-organism, namely, edema of the subcutaneous tissue and marked parenchymatous degeneration of the kidneys, liver and heart.

Antitoxic Serum Produced

An antitoxic serum was produced by immunizing a pig with increasing doses of the toxin. This serum protected guinea pigs against a multiple fatal dose of the toxin. The production of an antitoxic serum proves that the toxic substance contained in the muscle filtrate is a genuine toxin and not a definite chemical substance of an amine character.

Fig. 1. Pig showing edematous swelling of the neck and left shoulder region.

[3]A detailed report on the cultural and biological characteristics of this strain will be published later.

It was of the utmost importance to determine if possible, the source of the infection. The virus and serum used on the Arkansas pigs which died following vaccination was culturally and microscopically examined for the malignant edema bacillus or any near related gas-forming organism, but with negative results. Also, healthy susceptible pigs from our experimental pens were inoculated with the virus, but none of them developed malignant edema. Other pigs taken from the Arkansas shipment were inoculated with mixed vaccine, no hog cholera virus or serum being given. Several of them developed the disease. We therefore concluded that the infection must have originated from the integument of the pig and had been carried into the tissue by the needle at the time of inoculation.

In order to confirm our conclusions, scrapings from the skin and bristles from the axillary region of another lot of pigs from the same district in Arkansas were examined for the presence of malignant edema organisms. The scrapings were made immediately after the pigs were unloaded from the car. Sterilized milk was inoculated with these scrapings and bristles, and incubated for 24 hours at 37°C. The milk was markedly fermented and coagulated by the bacterial growth. It was then kept at room temperature for a few days to allow spore formation, and was then heated for one hour at 80°C. to destroy contaminating organisms, and was inoculated subcutaneously into guinea pigs. All the guinea pigs inoculated with this material died within twenty-four to thirty-six hours. From the edematous swellings of these animals, an organism was recovered which was miscroscopically and culturally identical to the one obtained from the pigs dying of malignant edema.

Contaminated Skin Source of Infection

These observations and experiments proved without a doubt that we were dealing with a most foudroyant malignant edema infection originating from a heavily infected skin. We know from a great number of investigations that the malignant edema bacillus is frequently found in contaminated soil, and when we consider that pigs continually wallow in the dirt and mud, it is not surprising that they carry this organism on their bodies.

Because of the contamination of the skin of pigs with the spores of the organism, this disease is a factor to be considered in subcutaneous and intramuscular inoculation, especially in the administration of anti-hog cholera serum. The large quantity of material that is injected into the tissue when anti-hog cholera serum is administered, injures the tissue and consequently lowers the resistance to infection. These areas are excellent foci for the development of spores which may be carried in with a needle from the skin and give rise to an infection.

Many cases have been reported following vaccination in which the animals died within two or three days. Some of these were diagnosed as hemorrhagic septicemia; others were not explained. Such cases can be cleared up only by making a microscopical examination. In all our cases we detected the malignant edema bacilli in smears stained with carbol-fuchsin or with Gram's method.

When malignant edema develops following vaccination, the veterinarian administering the product, as well as the product itself, is placed in a bad light un-

Fig. 2. Same as Fig. 1, showing extensive edema of the subcutaneous and muscle tissue.

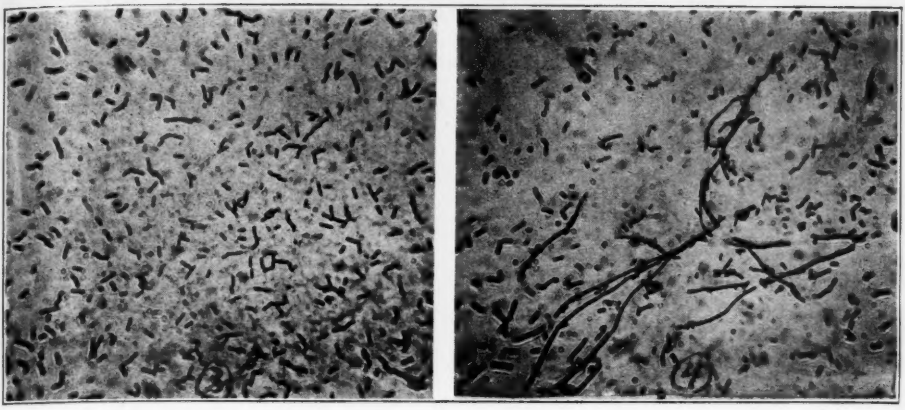


Fig. 3. Smear from brain liver bouillon showing malignant edema bacilli. Gram-fuchsin. 1/12 oil immersion. Ocular II, Zeiss.

Fig. 4. Smear from liver surface of guinea pig showing long filaments of malignant edema bacilli. Gram-fuchsin. 1/12 oil immersion. Ocular II, Zeiss.

less a correct diagnosis and careful examination is made. When the animals die within two or three days after vaccination, it is only natural that the owner should attribute the loss either to the serum and virus used or to lack of skill on the part of the administering veterinarian. When the animals are harboring the organism on their bodies, it is unnecessary for either party to shoulder the blame if a proper diagnosis is made and the source of the infection discovered.

Precaution in Preparing Field

Because of the enormous resistance of the spores to heat and to ordinary disinfectants, the usual methods for preparing the field of inoculation are ineffective. The situation might be handled by the use of a concentrated solution of carbolic acid applied to a small area where the inoculation is to be made. The needle might be immersed in the same solution. Even this procedure may not destroy the spores, especially those which may be covered by the bristles and desquamated layers of the skin.

Recently laymen and some practicing veterinarians have been inclined to believe that the malignant edema infection is causd by the contamination of biological products with the malignant edema micro-organism. From our experience we are inclined to believe that contamination of hog cholera serum and virus with the micro-organisms of malignant edema, can be entirely excluded if all precautions are used in preparing these products. As stated above, we were never able to demonstrate the presence of the malignant edema bacillus in hog cholera serum or virus.

On account of the rapid course of the disease, there is little to suggest in the way of treatment. If the swelling is localized, the affected areas might be opened and cleansed with a strong solution of potassium permanganate. However, we do not know how effective this procedure may be.

Our experimental investigations have shown that a highly potent serum can be produced by immunizing animals with the toxin of the malignant edema bacillus. At present we are not prepared to state the therapeutic value of such an antitoxic serum in foudroyant cases of malignant edema, but the situation might be handled by using an antitoxic serum as a prophylactic in herds where previous outbreaks have occurred. This antitoxic serum could be mixed with hog cholera serum and used in conjunction with the latter product. At present such a serum is not obtainable commercially; however, if the losses from malignant edema following simultaneous vaccination, are increased to an alarming extent an antitoxic serum can easily be prepared in any quantity.

Obstetrical Practice in Swine*

By FRED MAXFIELD, D. V. M., Tama, Iowa

UNTIL a very few years ago, dystocia in sows was a phase of veterinary practice that did not concern the veterinarian to any marked degree. Swine were not of sufficient value to warrant farmers in general employing the services of a veterinarian to treat swine individually. The practitioner was kept busy calling on cases of bovine and equine dystocia. Since the treatment of dystocia in sows is time-consuming, it affords no particular inducement to encourage regular practice along this line.

The tide, however, has been gradually turning, and in the last two years there has been a distinct change in the practitioner's affairs, so that today equine practice is not a prime factor in the ordinary veterinary practice. To a more marked degree, equine obstetrics have fallen from the spring list of calls. On the other hand, in spring the country practitioner is well nigh swamped with calls for swine obstetrics. In a general sense, the value of the brood mare and her offspring and that of the brood sow and her offspring have been completely reversed.

In going through the index of the *American Journal of Veterinary Medicine* for 1914 and the succeeding years, searching for the subject of "Obstetrical Practice in Swine," under the headings, "Cesarean Section in Sows," "Dystocia in Sows," "Obstetrics in Sows," etc., we find no articles on these subjects.

During the year 1915 we find one article was published in the February issue—an article presented before an Indiana association, in which the writer, in a general way, gives the technic for the operation of cesarean section.

The year 1916 records no articles on these subjects.

In the year 1917 the *Journal* contains five articles on problems of obstetrics in swine. The January issue contains an article entitled "Cesarean Section Under Difficulties"—the main difficulty being that the bladder was greatly distended, and in attempting to evacuate it by pressure with the hand it was perforated by a finger.

In the July, 1917, issue appears question No. 307: "Is it advisable to breed a sow after cesarean section, and with what success if the sow is bred?"

In the August issue of the same year appears an article, "Successful Cesarean Section Under Seemingly Hopeless Conditions," from which we quote: "On making the opening through the abdominal wall, I found the cavity filled with a large amount of yellow fluid."

The year 1918 slipped by with the *Journal* publishing no articles on the subject. This perhaps is not a fair test of interest in the subject, since hundreds of articles in some way pertaining to the war were published to the exclusion of articles on problems of practice.

In the June number appears an article entitled "Successful Cesarean Section."

In the October number there is cited "Case Reports" on the operation of cesarean section in sows.

In the November issue there is an article on "A New Anesthesia for Hogs." The new agent was H. M. C.

From this data one could reasonably draw the conclusion that this operation is not generally employed by the profession at large, and that success from this operation is rare. However, I know a good many veterinarians who are performing this operation with reasonable success.

We find this subject occupied more space in 1919 than for the four preceding years combined. Ask yourselves the question, Why?

Adaptability Important Factor

The problem of establishing and maintaining an obstetrical practice in swine presents some difficulties. Above all, the veterinarian should be adaptable to this branch of practice, at least in his physical proportions. The gigantic man has no place in this field—a great amount of adipose is a handicap.

Educating the farmer in the matter of choosing the type of brood sow, not only as to conformation but as to disposition as well, is a most important work. He

*Read before the Iowa State Veterinary Association, January 13, 1920.

should be instructed along the line of feeding and care of the brood sow; providing sufficient and necessary range; providing adequate shelter for brood sows at the farrowing season, and in giving attention to each sow during the farrowing period. The number of brood sows to be kept over should depend entirely upon the housing facilities.

The general employment of any or all pig forceps on the market should be avoided. All are too large and will surely do damage to the sow, even in the hands of the most careful veterinarian. One should always be in readiness to demonstrate the operation to the farmer. One can easily prove to him that if the operation is performed early, the sow has a good fighting chance for recovery. The best assistant that I know of is a boy between the ages of seven and nine years, who will work faithfully under your directions. I know of one veterinarian's wife who does all this part of her husband's practice each spring.

In examining the farrowing sow, care should be taken to avoid exciting and frightening her. Endeavor to work with her patiently and not against her efforts. When making an examination or trying to effect a delivery, the hand should always be well lubricated. I recommend the use of raw linseed oil or vaseline. Use a syringe with a long nozzle and inject oil around the dead fetus and dry before attempting to deliver it.

The operator with a small, lean, slender hand, wrist and arm can usually make a delivery of pigs that he can merely touch with the tips of his fingers. At least he can succeed in lodging the pig in the pelvis. Having a pig lodged, by using a wire loop or a hook and a wire loop, delivery is possible in the majority of cases.

The wire loop is made from the ordinary stove-pipe wire that may be purchased at any hardware store. A heavier gauge wire is not so good, because when once bent it cannot easily be rebent. A smaller gauge wire cannot be used to advantage, as it will bend and double when attempts are made to place the loop in the vagina. The hook is patterned after an ordinary button hook, having a longer shank that is a little stronger. The hook is bent at nearly a right angle to the shank. It should be blunt, strong and not over a quarter of an inch in length. One should never attempt to make a delivery with the aid of the hook alone, but should use the wire loop also. The main use of the hook is to hold the pig in position and to aid as a guide in applying the wire loop.

Pituitrin has its place and gives remarkable results at times when employed in the class of dystocia for which it is intended. Inertia of the uterus, with the uterus retaining live fetuses, does not represent anywhere near the majority of the dystocia cases in sows. So pituitrin has only a limited field of usefulness, and it should not be used as a general routine remedy in handling these cases. Since all these efforts and means have only a certain helpfulness in any specific case or in all the dystocia cases in sows, in many instances the cesarean section is indicated, or must be resorted to in a final attempt to save the sow.

The indications for this operation are more easily determined than it is to decide when not to operate. A few don'ts to heed are:

Do not attempt to operate by lantern light.

Do not operate if the sow has a persistent hacking cough.

Do not operate if the sow cannot be provided with comfortable and dry quarters after the operation.

Do not operate if the sow has been in labor for three or four days.

Do not operate if there is present severe laceration from the use of forceps.

Do not operate if the sow is in a pronounced coma.

Finally, DO NOT DELAY the operation too long.

Where should one perform this major operation? Any other place is better than on the ground. Any other place is far more sanitary than a filthy old hog house, where the dust has accumulated year after year. It is best to take an improvised operating table out of doors on the sunny side of any building and get the sow off the ground. At any rate, one's back will feel more comfortable after the operation.

Shall an Anesthetic Be Employed?

The question of the employment of anesthetics is an important one. Sows are placed in two classes according to their temperament: the docile and the irritable.

Employ anesthesia on the docile type of sows. On the irritable and cross sows use merely restraint. If you have ever used chloroform on hogs for any operation, you doubtless have given your oath, as most of us have, never to attempt it again. Personally, I would rather take my chances in performing this operation without the use of any anesthetic than to use chloroform. Use ether.

Methods of Restraint

Whether you operate under restraint or under the influence of an anesthetic, don't rope the hog down. In the time consumed in doing this, one can have the sow anesthetized or the abdominal incision completed and all pronounced struggling over. Two strong men can easily hold the hog.

The difficulties one encounters in making the abdominal incision and opening the cavity are quite constant and uniform. Often when incising the perineum a fluid gushes from the cavity. Roll the sow into a sternal position and by pressure with your hands in an upward direction, force as much of the fluid out as is possible. Don't be over-concerned about the amount that is present or the quantity that you succeed in expelling. More often than not the bladder will be found distended with urine to such an extent as to cause alarm that it may rupture at any moment. With the horse trocar, by way of the abdominal incision, evacuate the urine. Don't try to completely empty the bladder by this means, because you won't succeed. Just enough to relieve the excessive tension is all that is necessary.

The factors that will determine the success of the operation in the general run of these cases will depend upon:

1. How long the sow is kept under restraint or under the anesthetic.
2. Upon time exposure of the uterus and its contamination.
3. Last, but not least, success will depend upon leakage from the closed incision in the horn or horns of the uterus.

We should be able to perform this operation without hemorrhage that requires the employment of hemostats.

Preparation for the Operation

Have the improvised operating table in readiness. Have the pen, in which the sow is to be placed following the operation, well bedded and the trough filled with fresh water or milk. Have a gallon of boiled water ready for the working solution at the table. Have plenty of muslin for covering the flank region, a bottle of tincture of iodin, a box of dusting powder or a can of pine tar, and a quarter pound can of ether on the table.

Have ready two basins, one for the instruments and the other for cleansing the field of operation. The instrument basin should contain a pair of curved scissors, two small needles threaded with chromic gut, three double curved needles threaded with strong suturing thread, a probe-pointed bistoury, a sharp operating knife and a horse trocar.

The cleansing basin should contain a pair of hand clippers, razor, cotton and a bar of soap. Liquor cresolis compositius is a good antiseptic to use in the water.

Preparation of the Sow for the Operation

Pick up the cleansing basin, slip gently and quietly into the pen where the sow is kept, stoop down, clip the hair off the operative field, lather, shave and recleanse the field. This is all accomplished usually by the operator without the use of any method of restraint.

Place the sow on the table with one man at the head, with one hand holding the upper ear and the other holding the upper fore leg. Station the other man at the rump, with one hand grasping the tail and the other grasping the upper hind leg. Dry the operative field and paint with iodin.

Anesthetize with ether at once. The ether is taken away from the sow just as soon as the horn of the uterus is laid upon the gauze that is spread over the flank region.

The Operation

Test for surgical anesthesia. Make the incision downward and forward in either flank. I operate on the left side usually. Cutting down through to the perineum, puncture, enter a finger and enlarge the opening by using the probe-pointed bistoury, to freely admit the hand. Roll the sow over in a sternal position, press from beneath upward with the hands and roll her back to the former position. Tap the bladder if necessary. The moist muslin is placed over the region and the horn that is uppermost is brought out of the cavity.

No anesthetic is necessary for the remainder of the operation.

Make the incision in the horn over the body of the fetus lying nearest the uterus. The incision should be made parallel to the long axis of the uterine horn and of sufficient length to permit the easy removal of the fetus. The remaining fetuses are removed through the same incision. Remove the placental membranes. If the other horn is gravid, remove the fetuses by way of this incision. Swab out the horns of the uterus by means of dressing forceps and cotton. Cleanse the uterine wound margins and close with a Lambert suture. Cleanse the horn and replace. Cleanse the wound margin and suture, using an interrupted stitch, including the skin, muscular layer and the peritoneum. Paint with iodin and use the dusting powder or the tar.

In removing the sow from the table, use two men, one at the head with each hand holding an ear; the other man is at the rump with a firm grasp of the tail. Lift the sow clear off the table and let her gently down to the ground, standing on all four feet. Let her stand a few minutes, then drive her into the pen. She will walk nicely and will usually drink some of the water or milk before she lies down on the clean bed of straw.

If the weather is cold, cover her with plenty of fresh straw and leave her entirely alone. In the trough there is to be placed two or three times daily a supply of warm slop. A slop diet should be given for at least a week following the operation, at which time the sow can be turned with the other hogs. Sows that survive the forty-eight hour period and are gradually gaining strength recover nicely.

Prolapse or Eversion of the Oviduct and Cloaca of a Laying Hen

By B. F. KAUPP, D. V. S., M. S., West Raleigh, North Carolina

PROLAPSE or eversion of the oviduct* is a common ailment of laying hens. Stimulating feeding and aggravated constipation have been found associated with this condition as causative factors. When the eggs are large and considerable straining takes place during their passage, inflammation of the mucous lining of the oviduct or egg canal, prolapse or protrusion of the mucous membrane through the cloaca may be observed. In constipation, the bowels become gorged, and this in addition to the obstruction when the egg canal contains one or more developing eggs, and the ovary, being active, is larger and added to the bulk, predisposes to prolapse.

This condition is most often seen in hens that are heavy layers. It perhaps occurs most frequently in old hens. If the prolapse or protruding mucous membrane is allowed to extend through the anus, it soon becomes inflamed from exposure to the air and infection. Later the parts may become ulcerated as a result of mechanical injuries or the atack of germs.

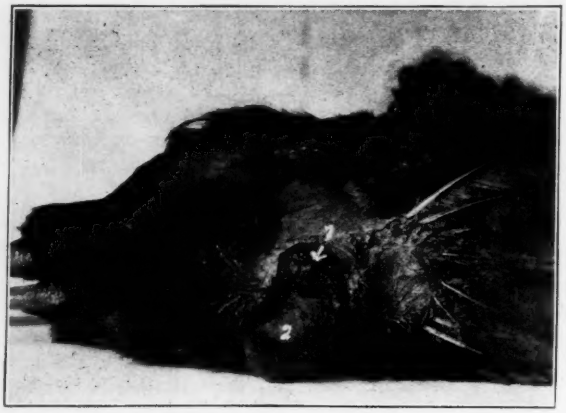
*Poultry Diseases, Second Edition by Kaupp, p. 153-5.

Prolapse of the cloaca may occur in heavy layers that roost on high perches and fly long distance to the ground, especially when the wings are clipped. If these birds are allowed a low roost and a limited diet they will recover. This condition will then bring about a condition of rest of the reproductive organs, as the food will not be sufficient for egg development to continue.

In larger animals both ante-partum and post-partum prolapse of the vagina occurs. Ante-partum prolapse occurs most frequently in the cow and sheep; rarely in the mare or bitch. It consists in the protrusion of the vagina by the uterus and its contents during pregnancy, the tumor it forms appearing between or external to the labia of the vulva. It is prone to occur in animals whose tissues are soft and relaxed; animals of a lymphatic temperament, good milkers, with a wide pelvis, and which are fed an abundance of bulky but innutritious food.

Eversion of Cloaca in Rhode Island Red

The present case illustrated occurred in a pure bred single comb Rhode Island Red



Eversion of the oviduct and cloaca of a Single Comb Rhode Island Red hen. No. 1. Eversion of the vaginal portion of the oviduct. No. 2. Eversion of the cloaca involving also the posterior portion of the rectum.

hen No. 151 hatched in 1918 and who was a member of the North Carolina Agriculture Experiment Station flock. She was not noted to be ill and was found dead in the house.

At autopsy a careful examination showed an eversion of the vaginal portion of the oviduct, with an eversion of the cloaca involving the posterior portion of the rectum. No. 1 in the illustration shows the everted vagina and No. 2 the everted cloaca. The eversion of the cloaca was complete. The outer portion of the cloaca was congested and of a bright red color.

Further examination showed all other organs normal so far as gross appearance was concerned.

The ovary was functioning, and there was a fully formed egg in the uterus. The bird appears to have been in perfect health prior to the eversion of the oviduct and cloaca.

Bacillary Edema and Suppuration of the Fowl

By B. F. KAUPP, D. V. S., M. S., West Raleigh, North Carolina

OUR attention was first called to this disease in 1916. The first case manifested edema of the face, comb, and wattles. An organism was isolated from this case. The bird did not respond to treatment and died. No other cases came to the laboratory till 1919. In August, 1919, a breeder from New Jersey wrote as follows: "I have a disease among my birds which manifests itself as sores on the skin surface of the body. Some of these appear under the wing as though commencing with a small wound." At our request a sick bird was sent to the laboratory for study. This case is described below as Case No. 3.

In the early spring of 1919 a case occurred at the poultry plant at West Raleigh. This case is described below as case No. 2. Prior to this time a case developed in a flock of range single-comb Rhode Island reds. This bird showed evidence of a paralized wing, which upon examination revealed a partial, pendulous held wing, due to partial loss of muscular control of the part due to edema. This bird was placed in the hospital, but made very slow improvement. After the lapse of six months there was still some thickening of the structure of the forearm. The bird appeared in excellent health and had perfect use of his wings but the structures did not return to normal size.

Clinical Study

Case No. 1. A single-comb white leghorn, two years old. The first symptom to appear was a swelling or edema of the comb, face and wattles, as shown in Fig-

Fig. 1. Edema of the face, comb and wattles. Case No. 1. Single Comb White Leghorn hen.

ure 1. At first there was no loss of appetite and very little dullness shown. Later the appetite was impaired, and the bird gradually became emaciated and died. At autopsy there were no gross changes of the internal organs, and media inoculated from the heart blood, kidneys, liver, and spleen were negative. Inoculation of media from sterilized sections of the comb revealed a small short bacillus to be described later.

Case No. 2. A single-comb Rhode Island red cockerel described above as making a partial recovery.

Case No. 3. A barred Plymouth Rock cockerel seven months old. About a month before being sent to the laboratory there appeared a small sore or erosion under the wing. The bird appeared in good health, appetite normal, excreta normal and the disease appeared to be local in nature and not affecting the bird constitutionally. After the lapse of about three months the sore was covered with thick scab, emitting an offensive sickening odor and covering the entire under surface of the wing and that portion of the chest touched by the wing. Figure 2 shows a photograph of the earlier stage of the disease. The excresence piled up, reminding one of a severe case of scaly legs or scabies as sometimes seen in cattle where the scabs were not molested but allowed to pile up. The bird showed a partial loss of appetite, gradually became emaciated and finally died. At autopsy the organs showed no gross evidence of lesions and media inoculated from the heart, blood, liver, kidneys, and spleen were negative.

Case No. 4. A barred Plymouth Rock cock, one year old. It was a member of a breeding pen and had shown no signs of illness till he was noted with a droopy wing. Examination revealed a drooped wing, due to the partial and later complete loss of the muscles of the wing caused by edema of the structures of the arm and forearm. Later, sores appeared and we had a combination of plain edema plus the sores as noted in birds from which case No. 3 came. An offensive sweetish sickening odor was given off by the sores. The bird rapidly became emaciated, lost its appetite and died. At autopsy no gross changes of the internal organs were noted.

Iodin was applied to the swelling in several cases and also to the sores, but no noticeable beneficial effect was obtained.

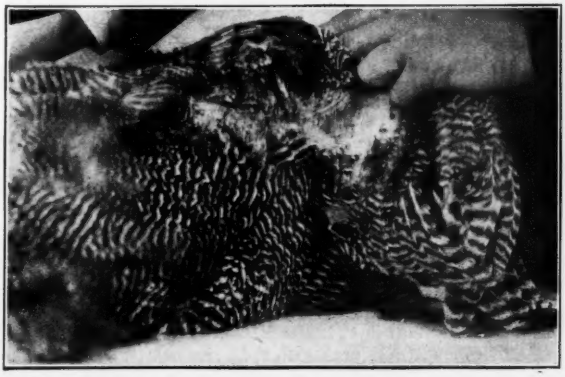


Fig. 2. Sore and edema in the region of the wing and side of the chest. Barred Plymouth Rock cockerel.

Inoculations

From an organism isolated from the sore of cockerel No. 3, rabbit No. 1 was inoculated subcutaneously, October 11, 1919, 3 mil of a 48-hour bouillon culture being injected.

Three days later an abscess had formed —small in diameter and extending along the needle tract. The pus was not abundant but rather thick and creamy and infiltrated through the fascia so that large quantities were not obtainable. When open this abscess gave off the same sweetish, sickening odor noted from the bird with ulceration on the under side of the wing. The same odor was given off from the cultures in incubation. The rabbit appeared in good health, did not appear depressed, appetite good. The disease appears to be one of local nature.

Pure cultures were isolated from the abscess.

Inoculation No. 2 was made subcutaneously into the wing of a silver campine cockerel. Two mil of a 48 hour old bouillon culture was injected. At the end of twenty-four hours edema appeared, but gradually subsided after causing destruction of the tissue surrounding the point of inoculation. The sweetish, sickening odor was noted in this case as before.

Inoculation No. 3. There was given four mil. of a 48-hour old bouillon culture, subcutaneously, in the under side of the wing of a four-months-old silver campine pullet. At the end of twenty-four hours there was slight drooping of the inoculated wing. There was no depression and no loss of appetite. At the end of forty-eight hours the wing hung quite pendulous, with edema of forearm or region inoculated. The bird showed no depression, picked at one's hand when it was extended into the coop, and had a good appetite. There was sloughing of the part inoculated and the sweetish, sickening odor, described above, was lacking.

Inoculation No. 4. Rabbit No. 2 was inoculated subcutaneously in the under region of the abdomen with three mil of a 48-hour old bouillon culture. An abscess developed in three days similar to the former inoculated rabbit. There was no depression and the appetite remained good. The animal was killed in the death chamber at the end of three days, for autopsy purposes. The abscess condition was similar to that of rabbit No. 2. The organism under study was isolated in pure culture.

Inoculations Nos. 5 and 6. These were made in wounds made on the under side of the wing of young chickens. One of these cases slowly developed the disease, the sore giving off the characteristic odor, and the second inoculation remained negative.

Inoculation No. 7. A half grown rabbit was given three mil of a 24-hour old bouillon culture of the organism under study. An abscess developed at the end of three days. The course was similar to that of the two other rabbits and the results were the same.

Inoculation No. 8. Three mil of a 48-hours old bouillon culture was given subcutaneously in the under side of the forearm of a one-pound, single comb white leghorn pullet. The organism was isolated from the edematous tissues of case No. 3.

A Study of the Organism

Character of the organism.—The organism is a bacillus, the average length of which is 1.0 μ long and 0.5 μ thick, ends rounded; Gram positive; no spore formation; flagella, peritrichiate; capsule, absent; growth at 37°C., abundant; staining reactions. It stains readily with ordinary aniline dyes, as fuchsin, methylene blue, gentian violet, Leoffler's methylene blue. With fuschsin there is a tendency to polar staining.

Cultural features. Agar stab; growth, moderate with tendency in old cultures to spread. Concave on top. Line of puncture filiform.

Agar colonies. Dew-drop colonies. Colonies at the end of 24 hours are slightly raised, color, grayish and glisteny. Odor decided, sweetish, sickening.

Gelatin stab. Growth, moderate, best on top. The gelatin was inoculated November 15, 1919. The tubes were allowed to remain in the room, or in other words, were incubated at room temperature. November 19, 1919, there was a slight yellowish tinge to the medium. A slight cup-shaped liquefaction on the surface at the point of inoculation. On November 20, 1919, or five days after inocu-

lation of the culture medium, there was a typical napiform liquefaction. Odor decided.

Nutrient broth. Clouding at first moderate, later strong. Slight ring on the glass at the juncture of the top of the medium and glass.

Milk. Solid coagulation at the end of forty-eight hours. No digestion of curd or evidence of proteolytic ferment at the end of seven days.

Potato. At the end of twenty-four hours there was a grayish-yellow growth which by the forty-eighth hour had changed to a canary yellow. The growth was fairly abundant with little tendency to spread.

Thermal death point. Time of exposure in water bath, ten minutes.

Temp C.	24 hrs.	48 hrs.	72 hrs.	7 days
Control	+	+	+	+
45°	+	+	+	+
48°	+	+	+	+
52°	+	+	+	+
55°	—	+	+	+
58°	—	—	—	—
64°	—	—	—	—

A temperature of 55°C. arrests growth and 58°C. kills the organism. The thermal death point then is between 55° and 58°C., probably about 56 or 57°.

Discussion

In a study of pathological cases coming to the Pathological Research Laboratory of the Office of Poultry Investigations and Pathology of the North Carolina Experiment Station, there has been observed a series affected with edemas and with suppurative sores which in fowls pile up excresences, due to the fact that pus in the fowl is cheesy and not liquid, which show no tendency to recovery.

From lesions of a particular type there was regularly isolated a small, motile, gram-positive, polar-staining bacillus.

This organism stains readily with ordinary anilene dyes and with Gram. Grows abundantly at 37° F. It is peritrichiate and is 1.0 by 0.5 μ in size.

(*Continued on Page* 300)

Professor James Left Without a Leg to Stand Upon

In reading over the Journal, as is my habit almost as soon as it arrives, I came upon an article headed "Massachusetts Would Save the Tuberculous Cow." I do not know who gave that heading to the article but I do not think that the writer really meant what the heading indicates.

It goes on to say what Prof. Delos L. James of the Massachusetts Agricultural College thinks regarding milk from tuberculous animals. Some portions of the article seem to indicate that Prof. James either is of the old backwoods farmer type or that his intellectuality is greatly impaired. I do not know just what he means in his article, but if he really believes what he says I, for one, am sorry to see, that instead of old Massachusetts progressing in eliminating tuberculosis, it is receding.

He says he has tested *hundreds* of cattle and has seen the postmortems. Surely if he has seen the postmortems he must have had reactors. I will agree that probably very few of the reactors showed lesions of tuberculosis in the udder, possibly on bacteriological examination they were not even then found; nevertheless the organisms were in the body somewhere.

Then again he says that milk from tuberculin tested cows does not mean that the milk is free from the organisms. That may and may not be so. If the milkers are tuberculous they may contaminate the milk, and on examination tuberculosis organisms be found.

Again he says "we have been frightening people long enough about dirt and disease." Possibly Prof. James is used to dirt and does not mind it in his milk or other food. Also, he may have consumed sufficient dirt and organisms in his milk so that he has formed an immunity against them. But what about the children and babies? Surely a man with any sense whatsoever would not make such a statement if he stopped to think of the countless numbers of children and babies whose sole diet is milk.

Once again he makes the statement that

"people have ceased to use as much milk, and in proportion their resistance to disease has correspondingly decreased." I think that if Prof. James studied statistics he would see that the increase in milk cows from last year to this year was 272,000 head or 1.2 per cent. Now, it only stands to reason that if people were not using as much milk the number of head of milk cows would not increase at this rate in one year and the price of cows almost treble in value. In fact, it seems to me that Prof. James has not a fact to prove that his statements are correct.

I know for a fact that all cows on the grounds of the Massachusetts Agricultural College are tuberculin tested regularly. I also know for a fact that all animals brought in are tested. Also, that any reactors are immediately disposed of and their milk discarded until disposition is made of the cows. It is not even pasteurized and fed to calves or hogs. I do not feel that because one person who apparently is not familiar with the disease, that the state of Massachusetts, the best state in the union, the state that holds itself up as the foremost in law and order and all that goes for health, happiness and prosperity, should be put on record as being against disposing of the tuberculous cow. I doubt if there are any other state veterinarians with a better chief or who works more conscientiously in eradicating disease from its domestic animals than those of the State of Massachusetts.

I would suggest that Prof. James procure a standard work on Tuberculosis and study it carefully, especially as regards its transmission to children and babies.

F. G. RUDER, V. M. D.

Amherst, Mass.

LIVING COLT DELIVERED DESPITE EVERSION OF VAGINA*

I was called to see a nine-year-old mare that had been in labor about four hours. The cervix was closed and protruded about twelve inches and was about the size of a common water bucket. I could not dilate the os, but in palpating the mass, I thought I could feel a foot, and told the owner I would like to operate if he had no objections, but that I did not know what the results would be. He said: "Go ahead," and he would not think hard of me if the mare should die.

The mare was still under the effects of chloral hydrate that I had given her. So I operated with a blunt bistoury, cutting in the cervix upwards until I had got through the hard mass. I then introduced my hand and found a fore foot. I corded it and pushed it back in and found the other forefoot; brought it up and tied it; found the head turned to one side; brought it up; and after some traction on the fore feet and head, I delivered a fine filly colt.

After bathing the mare's head in cold water a few minutes, I removed the placenta. The mare saw her colt and soon got up. I led her to a pond, down a steep bank and the parts all returned to their normal position. She got along nicely and was not bred that year, but the following year was bred again, and the next year gave birth to a mule colt without trouble.

B. L. TERRELL.

Dresden, Tenn.

*Read before the Tennessee Veterinary Medical Association, Oct. 28, 1919.

BLACKLEG CULTURE FILTRATE GIVES SHORT IMMUNITY

The idea that one vaccination with blackleg-culture filtrate would confer life immunity has become quite prevalent among live stock owners in some localities, as a result of intimations made by some biological firms. Field trials were made by Hart with the young cattle in the University Dairy on the Berkeley campus, which showed that this material will not confer life immunity in animals vaccinated under six months of age. In many parts of California, vaccination under the age of six months is necessary to prevent losses.

There was a total of 14 animals in the culture-filtrate experiment and 2, or 14 per cent, developed the disease after one vaccination. Most of the animals were over six months of age. One calf, born December 22, 1917, and vaccinated January 23, 1918, developed blackleg May 28, 1919, but recovered after large doses of blackleg serum were administered. Another calf, born September 7, and vaccinated the latter part of December, 1918, died of the disease April 18, 1919.

It is, therefore, recommended that where this material is used, all animals of susceptible age be vaccinated twice yearly.

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"Fortune Favors the Forehanded Man"

THROUGHOUT at least the greater part of the swine-raising section of the middle west there has been a distinct let-up in vaccination for the prevention of hog cholera during the past sixty days, as compared with work of this kind done during April and May of last year or the year before. Possibly it is a safe statement to say that there has been less vaccination of hogs done during the past two months than during the same two months in any year since the use of anti-hog cholera serum has become common and its value as a preventive for hog cholera generally recognized.

This is not as it should be. Hog cholera is still the most dangerous enemy of the swine industry; and the industry is inviting disaster to just the extent that it neglects to protect itself from the ravages of hog cholera.

The reason for so small an amount of vaccination having been done during the past season is easy to see. The apathy of swine raisers in the matter is due to the light losses from hog cholera last year; but it is folly to overlook the fact that these losses were light last year because of the very general and wide spread use of anti-hog cholera serum early in the season, both last year and the year previous, and that with the present great commerce in breeding and feeding hogs, the vast interchange of animals between herds and between states for purposes other than slaughter, it is not reasonable to expect to escape dire losses from cholera except by the same means that these losses were escaped last year—that is, by wide spread vaccination early in the season.

Veterinarians bear some of the responsibility for this letting down of the bars against hog cholera. It is obvious that the veterinarian's interest in preventing loss from hog cholera is scarcely less direct than that of the swine owner. Two years ago there was a great serum shortage and veterinarians and swine owners in the latter part of the season were, in numberless cases, unable to obtain serum when they needed it. As a result, last year veterinarians were anxious to obtain serum and, very early in the year, were contracting for their estimated needs throughout the season, to make sure of a supply when they wanted it. Having bought the serum, naturally they urged its use more than they are urging it this year, when they do not have it on hand or contracted for. The farmer that was unable to get his hogs vaccinated the previous season because of the shortage of serum, readily listened to the urge of the veterinarian to have his vaccination done when he could, and as a result, last year, as never before, hogs throughout the swine-raising section were immunized early.

Last year, the conditions were reversed from what they were in 1918. There was a surplus of serum and the price decreased throughout the season. Through lack of

foresight, which is common to all, many practitioners, disregarding their experience in 1918, are neither procuring a supply of serum now, nor making contracts for it. The result is serum is not moving; there is still a surplus in the hands of the producers and very few plants are producing at this time. From the best information we are able to obtain there are less than 250,000,000 c.c.'s of tested serum in the United States now, and we doubt very much if there are 200,000,000 c.c.'s available now in the hands of the producers, distributers and practitioners.

Were all serum producers to begin today to operate their plants at full capacity, not a cubic centimeter of tested serum could be placed on the market before August 1st. It is more than doubtful if the quantity of serum on hand is sufficient to last until August 1st. It is certainly not sufficient to last until that time should there be a wide spread outbreak of cholera, a thing that is by no means impossible considering the small amount of vaccination that has been done in the past three or four months. The serum producers will not start hypering hogs today. Most of them will not have started producing a month from now, and the present supply will not be augmented much by the few plants that are running until long after August 1st.

The business thing for the practitioner to do and do now, is to purchase or contract at once for serum sufficient to supply his needs throughout the season. As good serum as was ever made can be purchased now, in any quantity, at less than the cost of production and distribution; at less than it has ever been offered before; at less, we believe, than it will ever be available again, while the present methods of production obtain.

The present extraordinarily low price of serum offers a powerful lever for the practitioner to start something in the way of vaccination in his community. Any practitioner with the ability to make things plain in simple language, to state facts, obvious facts, clearly and intelligently, can convince reasonable swine raisers of the advantages of systematic immunization against hog cholera. Why should any swine raiser continue haphazard methods of immunization, immunizing his hogs when an outbreak of cholera impends and putting off vaccination when his hogs are well, and none of his neighbors are losing animals? What would be thought of the business acumen, even the sanity of the swine raiser who carried insurance on his residence and other buildings for nine months or six months or three months in the year, and let these same buildings go for three months, six months or nine months without insurance.

The swine raiser who practices systematic vaccination of hogs is secure from the ravages of the greatest enemy of the swine industry. He faces the problem of an insurance premium every time a crop of pigs is large enough to vaccinate. The man who practices haphazard immunization escapes the insurance premium from time to time, but inevitably sooner or later must face a salvage problem. Which is the better for him to face? Which is better for the veterinarian? Would you rather treat a herd of hogs in which numbers are already dying from cholera or would you rather immunize pigs when there is no cholera in the community? Which patron will derive the greater benefit from your services? Which will pay his bill the sooner? Which will be the better satisfied?

The fact that a veterinarian can go to the swine raiser and tell him that it will cost him less, today, to vaccinate his hogs than it ever cost him before and in all probability, less than it will ever cost him again; can tell him that notwithstanding the cost of everything else that he must buy has been increased in some instances many fold, that he can buy anti-hog cholera serum of the highest quality at less than the cost of production, should make it easy for the practitioner possessing the confidence of his patrons to induce a very general systematic immunization of swine in his locality. It only requires the gumption, the guts and the get-up, to get out of the office chair and go after it.

It is perfectly ethical for a veterinarian to spend his time and his effort and his every resource to increase vaccination in his locality. It is a service to the live stock industry of his locality, and he hasn't any excuse for asking the community to give him a living except for services that he renders the live stock in-

terests of that community. We have not, as a profession, encouraged systematic immunization of swine. It is a perfectly feasible thing to do. Here and there, it has been done and has succeeded. The county agents can be depended upon to help in most instances; the bankers, a potent influence with the live stock industry, can be counted upon to further the project, and the serum companies will no doubt be willing and glad to assist under the direction of the local veterinarian. Let us emphasize that phase, "under the direction of the local veterinarian." His part in all of this should be such that no thought of other leadership would arise.

To summarize, systematic vaccination is more profitable to the swine industry, more profitable to the veterinarian and, in every way, more desirable than haphazard immunization.

If systematic immunization, which means immunization of all the hogs on a given farm all of the time, cannot be instituted, the earlier haphazard immunization is undertaken, the better.

An abundant quantity of high-class serum is available now at less than the cost of production, and that means less than it will be later on, for no firm will continue to supply serum at less than cost. They must get more for their products or go out of business.

Not only will serum be higher later on this season, but there is much reason to expect that there will be a shortage of serum before the season is over. Such a shortage is a certainty, unless our whole experience with hog cholera is reversed, and instead of getting more cholera this season as a result of the let-up in vaccination, we get less than we had last year with extensive vaccination. Should normal conditions prevail a shortage of serum in three to four months is inevitable.

It is the business, the duty, and the obligation of the veterinarian, of every practitioner in the swine-raising section, to encourage, and to urge and to force the immunization of hogs, and to do it now, when the serum is available, when the cost will be less than later on, and when with the passing of the early rush of spring work he can find the time to do it by just simply bestirring himself and rustling.

A NEW VETERINARY JOURNAL APPEARS

VOLUME I, Number 1, of the *Canadian Veterinary Record* made its appearance in May, bearing the date of April 1920. It is published from the Ontario Veterinary College, 110 University Avenue, Toronto, Ontario; but is not, it appears, an official publication of the college, but an independent enterprise. It enters a field in which there is a genuine need for such a publication and has much to commend it; and we welcome it and urge our hundreds of Canadian readers to support it.

Out of a greater experience, we may point out some possible improvements; some of these doubtless would be made in later issues whether they were pointed out or not, and others may be only matters of opinion. The editor asks for criticisms: We offer the suggestion that—Diligent attention be given to accuracy—we note but a single error in the first issue and surely that is not half bad. We are told that at the recent annual meeting of the A. V. M. A. in New Orleans, among other innovations, it was decided to raise the requirements for entrance to veterinary colleges to four years of high school preparation. In all conscience, this action by the A. V. M. A. was delayed long enough, and such credit as may be due the association in spite of unseeming procrastination in the matter should not be lessened by making it appear as though the action were but just taken.

Make it less exclusively Canadian. Canadian veterinarians are, to a degree, interested in the outside veterinary world. Our experience with Canadian veterinarians, and it has been wide, reaching the leaders and most of the others in every province in the Dominion, is that Canadian veterinarians' problems are not widely different from the problems of veterinarians elsewhere, particularly in the United States, and the Canadian veterinarian is much interested in the larger profession on this side of the line.

But, our severest criticism is directed to the advertising policy of the publication, and the faults here, we feel certain, are in the main, the faults of the novice. The high-class veterinary, commercial firms, the advertisements of a number of which ap-

pear in this publication, will not long be content to have their announcements appear alongside of or in the same publication with other firms of, to put it mildly, doubtful ethics, and whose advertisements are not carried by the older veterinary publications on this continent, nor do we believe permanent benefit, nor in the long run, any advantage can accrue to the publication from the announcements of numerous banking houses, hotels, dealers in sporting goods and other lines of industry but indirectly related to the veterinary profession, and such advertising cannot be a profitable investment to these institutions.

When an advertiser contracts with a publication, he wants to buy something more than space; something more than circulation; something more than quality of circulation; something more than purchasing power of those he hopes to reach. He wants to buy actual purchasing action on the part of the readers of the magazine, and most of all, that upon which such action largely depends, some part of the prestige and good will—in a word, the standing that the magazine has.

The space can do the advertiser no good without the circulation. The circulation is of little value unless it be among prospective users of his products. The prospective users of his products will not become actual users until they have confidence in him and in his products. This confidence is not a thing of mushroom growth, but rather of slow development. The advertiser has a short cut to his goal, that is, into the confidence of his prospective customers, if the publication in which his advertisement appears has the proper standing with its readers. Thus, he may purchase in a few issues a portion of what the publication has been years acquiring, and what many publications never acquire.

Since the AMERICAN JOURNAL OF VETERINARY MEDICINE has long carried more advertising and derived a greater revenue from advertising than all other American and English veterinary publications combined, and since, without succumbing to temptation, it has passed through that long and uncertain period, common to all new and struggling publications, when advertisers are greatly needed and temptation comes frequently to let down the bars just a little bit and accept some advertising of doubtful propriety, it may speak with some degree of authority in this matter.

There is just one line to hew to, just one standard to adhere to, and that is the highest. Refuse every proffered advertisement that does not come up to that standard, and when any advertiser, however profitable, departs from *the* standard, drop his advertisement. The AMERICAN JOURNAL OF VETERINARY MEDICINE has declined more advertising than any other veterinary publication in America carries. It has eliminated from its pages, advertisements carried in every other veterinary publication in this country of general circulation at this time. We neither ask nor expect any particular credit for this. It is the business thing to do, it is the profitable thing to do, and it is right. We merely review our experience for the guidance of our youthful contemporary.

The *Canadian Veterinary Record* is an improvement over a number of veterinary publications that have been started on this side of the line. It contains some good articles by leaders in the profession in Canada. It contains some good, though exceedingly brief, reviews of other veterinary literature. It contains many news items that must be of much interest to Canadian veterinarians and some news items concerning the Ontario Veterinary College and its alumni that must interest graduates of that institution everywhere.

It has a ring of sincerity and that is much. The editor is not affected with an egotism that impels him to think everyone else is interested in knowing how he did it or hopes to do it, nor is he pricked by a conscience that leads him to uninteresting and obviously insincere explanations. He is original, and that is tantamount to saying, he has brains. He doesn't fear to strike out for himself in his own way. There is something of newness and freshness in his magazine. He has made no attempt to foist an uninteresting, wishy-washy imitation upon his readers, nor felt called upon to defend his motives. In short, the *Canadian Veterinary Record* is good, and if it keeps on as it has begun, the Canadian veterinarians will support it, or we are mistaken in our appraisal of them. For the present it will appear only twice a year, but a promise of more frequent appearances later is given.

DOCTOR JOSEPH HUGHES

Although he had been in ill health for nearly three years, the death of Dr. Joseph Hughes of Chicago, which occurred on April 24th, came as a shock to veterinarians and live stock men everywhere, for no veterinarian in America was better and more favorably known in the profession or so widely known in the live stock industry.

Doctor Hughes was born in Newton, Knockbridge, Dundalk, County Louth, Ireland, and was educated in Christian Brothers School and Marist College, Dundalk. He was graduated from the Royal College of Veterinary Surgeons, at Glasgow, Scotland, in 1880, and spent two years as assistant to the city veterinarian of Dublin. During this time, he was engaged in, and to a large extent had charge of the most extensive cattle practice in the world.

He came to Chicago in 1882, and in the following year established the Chicago Veterinary College. The organizers of the school were the late Doctor Withers, president, Dr. A. H. Baker, vice-president and Dr. Joseph Hughes, secretary. Doctor Hughes was later treasurer, and since the retirement of Doctor Withers many years ago, had been president.

So closely has the school been interwoven with his activities, his biography constitutes a virtual history of the institution.

In his practice in Dublin, Doctor Hughes met, treated and became familiar with pleuropneumonia; hence recognized it at once when the outbreak occurred in this country in 1886. As a recognition of his indispensable assistance in stamping out this disease, he was offered the position of state veterinarian of Illinois, but declined it as he did on later occasions, because of his interest in the Chicago Veterinary College. As a result of his great assistance in keeping under control the very serious outbreak of glanders in this country, a few years later, he was made a permanent assistant state veterinarian of Illinois.

In the vast influence that Doctor Hughes has wielded on veterinary education in America, second in importance only to his work in the Chicago Veterinary College, ranks his work as a member of the commission to investigate the veterinary colleges of the United States, to which position he was appointed by President Roosevelt. On this commission he was associated with Doctor Welch of John Hopkins University, Dr. V. A. Moore of the New York State Veterinary College at Cornell and Dr. Leonard Pearson of the University of Pennsylvania. This commission was authorized to fix the status of the veterinary schools of the United States and to classify and accredit them, and its report is the foundation of, and marks the beginning of the revolutionary changes that have come about in veterinary education during the past fifteen years.

Doctor Hughes was active in the organization of and became a charter member of the Illinois State Veterinary Medical Association, the oldest state veterinary association in America. He joined the A. V. M. A. in 1890, and at once became one of its most active and influential members, serving on the executive committee of the association most of the time since then. He has been a member of the United States Live Stock Sanitary Association almost since its inception, and for many years active in, and a member of the board of trustees of the Missouri Valley Veterinary Association. He was an honorary member of a very large number of state and district veterinary associations, and with a number of other veterinarians, was instrumental in the establishment of the Chicago Veterinary Society in 1894, perhaps the oldest city veterinary association now in existence. He was secretary of the Chicago Veterinary Society a number of times and thrice its president.

Until the ill health of recent years precluded extensive traveling, he was a regular attendant at veterinary meetings in many parts of the country and was always in much demand on the program, to which he devoted his time and his great ability without stint. As a veterinary expert in legal cases, he was in greater demand than any other veterinarian, and he had undoubtedly participated in this capacity in more important litigation all over the country than any other half a dozen veterinarians combined. As a consultant in important cases and particularly in matters of lameness in road horses and in serious outbreaks of contagious or obscure diseases suspected of being contagious, the demand for his services for many years has far exceeded the time at his disposal for such work, and for a quarter of a century, he has

figured prominently in such cases from New York to Montana and from the Canadian border to the gulf.

When the breeding and racing of road horses was at its height in the blue grass region of Kentucky, his practice with this class of animals took him to Lexington so frequently that he was almost considered a resident of the place.

The greatest professional controversy in which he ever became involved, and also his greatest triumph, grew out of the outbreak of foot-and-mouth disease in 1914. Because of his recognized standing, he was immediately placed in charge of the $1,000,000 herd of dairy show cattle caught in Chicago by the quarantine at that time, and although the stand he took was opposed by the state and federal live stock sanitary authorities and was in sharp opposition to intimate life long friends in the profession, he stood fast and won, demonstrating the soundness of his contention. His position at the time was much misunderstood and the misapprehension has never been entirely cleared up. He did not oppose the slaughter method for the eradication of foot-and-mouth disease or offer any objection to its general application; but out of his thorough familiarity with the foot-and-mouth disease, a result of his acquaintance with this disease during the time he spent in practice in Dublin, where it was then very prevalent, he maintained that it was unnecessary to slaughter the herd of show cattle at Chicago and that they could be cared for throughout the outbreak and these irreplaceable animals saved to the dairy-breeding industry without endangering other cattle. There were something over 700 animals in the herd when the quarantine was established, and when it was raised, the number had increased to more than 900. All these animals were finally returned to their owners without carrying the disease or communicating it to other animals; but three were lost from foot-and-mouth disease in the something more than a year that they were in quarantine, and these were very young calves.

There is scarcely a veterinarian of prominence among the older men of the profession in America, to say nothing of the more than 2,000 graduates of the Chicago Veterinary College, all of whom came under the influence of his teaching and all of whom hold diplomas signed by him, who could not give interesting, instructive and inspiring reminiscences of his life and work, but the following appreciation by his lifelong friend and schoolmate, Dr. A. S. Alexander, Professor of Veterinary Science, University of Wisconsin, and Director of the Division of Horse Breeding, Wisconsin Department of Agriculture, because of the intimate association of Doctor Alexander and the late Doctor Hughes, is particularly fitting here:

An Appreciation of Doctor Hughes

"Dr. Joseph Hughes received his education in veterinary science at the Glasgow (Scotland) Veterinary College under the tutelage of Principal James M'Call and Professors McQueen, Cook and others. He had been given a liberal preparatory schooling in Ireland and therefore was better informed than some of the young men who, at that early day (1878) studied for the profession in the veterinary colleges of London, Edinburgh or Glasgow. A veterinary college was instituted at Dublin, some years later, but at the time mentioned the Glasgow Veterinary College was a favorite seat of learning for the gallant lads from the Emerald Isle.

"Doctor Hughes was a most efficient demonstrator in anatomy when I was a fellow student with him at the Glasgow Veterinary College and at that time, and ever after, he was the personification of neatness in dress and in all of his clinical and demonstrational work. He had a wonderful natural gift of deft manipulation of the scalpel, pen and chalk. Even in those student days he was a rapid and accurate "chalk artist," and during the many years of my association with him as a teacher in the Chicago Veterinary College I regarded that as a strong contributory factor to his success in the class-room. Many a student who, perhaps, was somewhat slow in comprehending word pictures, instantly "marked, learned and inwardly digested" the lessons that quickly and effectively were illustrated by Doctor Hughes. Many a horseman, too, has been delighted and instructed by his lucid and essentially sound and practical "chalk talks" relative to conformation and soundness.

"Having been brought up as a country gentleman, with splendid Irish hunters to ride and fine farm animals around him for

study on the home estate, Doctor Hughes brought with him to college an intimate love and acquaintance with live stock and farm life. He had already become proficient in riding, driving, judging, buying and managing horses, and the fact that he was also a sincere lover and close observer of the book of nature led him to acquire a fund of knowledge that greatly helped him in his profession. Not only was he a trained, experienced and expert horseman, but few knew better than he the best types of cattle, sheep and swine. It was, however, as a real scientist in all matters pertaining to the horse's foot and the diagnosing and successful treatment of lameness that Doctor Hughes particularly shone and that earned for him a national reputation and renown. He was well nigh clairvoyant in some of his diagnoses; and as an operator his skill was as remarkable and successful. We who know him longest and best will ever remember him for his quiet humor, his gentlemanly address, nattiness of attire, extreme neatness in all of his work, keen, ready wit, courage of conviction, manliness, kindliness and native shrewdness, diplomacy and tact. It is deeply to be regretted that the work on lameness, on which he had expended much time and thought, never saw the light, but his opinions, conclusions, instructions and advice live in the treasured note books of hosts of veterinarians throughout the land, while some of his technical and practical contributions to various journals long will be respected and regarded as classics on the subjects with which they dealt.

"Doctor Hughes has been called early to his reward, and in his passing the veterinary profession has lost one of its most eminent, inspiring and useful leaders. All whom he taught will mourn him as a friend, counsellor, just critic and master educator, and his many friends of the farming and live stock world will as sincerely miss him and cherish his memory for his sterling ability and manly attributes of character."

Doctor Hughes was a cousin of the late Dr. Thomas Carroll, head surgeon of the Government Hospital at Carlingford, Ireland, and a nephew of the late Rt. Rev. Monsignor Robert Murphy of Drogheda, Ireland.

He is survived by a widow, a son Reginald, two daughters, Helen and Josephine, a brother Bernard, and two sisters.

DOCTOR HENRY L. BEER

Dr. Henry L. Beer, Chief Sanitary Officer of the Union Stock Yards District, Chicago, Illinois, died at his home in Blue Island, May 9th. Dr. Beer was well known professionally and politically in Illinois. having practiced for many years in Blue Island, and having been a member of the State Live Stock Commission under two administrations.

During recent years, as Chief Sanitary Officer at the stock yards, he had supervision over all state live stock sanitary work at that place, and in this position his advice and guidance will be much missed. Dr. Beer was, in all things, thorough, exact, honest and upright.

He leaves a widow, two daughters and a son. The latter, Dr. John L. Beer, is and has been for some time, veterinarian at the Union Stock Yards Infirmary, and as such, has supervision over the treatment of probably more horses than any other veterinarian.

DOCTOR JOHN F. WINCHESTER

With the death of Dr. John F. Winchester of Lawrence, Massachusetts, the veterinary profession loses its oldest and most conspicuous worker in the field of public health work.

Dr. Winchester was born at Lynn, Massachusetts, in 1855 and died at his home in Lawrence, on April 27, 1920, from pneumonia. He was graduated from the High School in Peabody, Massachusetts, where he was reared, and from the Massachusetts Agricultural College at Amherst, where he received the degree of B. Sc. in 1875. Following this, he did post-graduate work at the college in chemistry and veterinary science, and then took a course in the American Veterinary College, New York City, where he received the degree of D. V. S. in 1878. Immediately after his graduation, Dr. Winchester went to Lawrence, Massachusetts, where he continued to practice for more than thirty years, and up to the time of his death.

Dr. Winchester was, for four years, Cattle Commissioner for Massachusetts and in this position attracted much attention because of his stand that tuberculosis in cattle was a menace to human health and life. Throughout his long, conspicuous and exceedingly useful career, Dr. Winchester

has fought the white plague and has striven to arouse public interest and apprehension in the matter. He has fathered every movement of public health in his home city for many years. He was a member of the American Public Health Association, and of the A. V. M. A., and many other scientific associations.

At meetings of the A. V. M. A. he has been a prominent figure for a quarter of a century. He was one of the most regular attendants at the annual meetings of the association and was its president in 1901-1902. His jovial nature, his sincerity, and his great earnestness procured and held a multitude of friends within and out of the profession. His influence on the veterinary profession of America has been great.

BOOK REVIEWS

Diseases of Domestic Birds

By A. R. Ward, B.S.A., D.V.M., Director Research Department, Jensen-Salsbery Laboratories, St. Louis, and B. A. Gallagher, D.V.M., Professor of Comparative Pathology, Bacteriology and Meat Inspection, New York State Veterinary College, Cornell University. Cloth, 332 pages. Illustrated. Published by The Macmillan Co., New York. Price, $4.00.

This is a comprehensive and commendable work on this subject. The authors have clearly and concisely described not only the various diseases of birds, but also have added a chapter on anatomy, sanitation, surgical operations, toxicology, tumors and the killing of poultry.

The general arrangement of the different topics may be questioned by some critics, in that the infectious diseases precede the general diseases. The chapter dealing with the anatomy of birds is relatively brief, but probably is sufficient for all ordinary purposes. The reference does not contain the name of one of the most noteworthy comparative anatomists.

The chapter on sanitation contains much valuable information but could have been given in more detail. This book would have been more complete and more appreciated by poultry men and veterinarians had chapters been included on the general care of birds, including feeding, clinical diagnosis and methods of medication.

The chapters on infectious and parasitic diseases are splendid, as a detailed description of the causative agent has been given; the lesions and symptoms are clearly detailed; and the prevention and treatment indicated.

The chapters on infectious diseases of ostriches and canary birds, although of special concern to those interested in ostrich farms and song birds, will be of value to veterinarians, as such concrete information relative to the diseases of these birds is not available elsewhere.

This book contains much new information and because of the importance of the poultry industry should be found in the library of veterinarians in practice and veterinary sanitarians—A. T. K.

The Topographical Anatomy of the Limbs of the Horse

By O. Charnock Bradley, M. D., D. Sc., M. R. C. V. S. Principal of the Royal (Dick) Veterinary College, Edinburgh, Lecturer on Comparative Anatomy, University of Edinburgh. Cloth, 172 pages, 115 illustrations in colors. Published by W. Green & Son, Edinburgh, Scotland. Price, 21 shillings, net.

This is intended as a guide for use in dissection and the study of anatomy. For this purpose, it will probably not displace Sisson in American veterinary schools, but for a review of anatomy as a preparation for surgical operations, the clear, concise, easily understandable descriptions and still more, the very excellent illustrations, will prove most useful, and the book should speedily attain popularity among veterinary surgeons who spare no effort to perform their surgical operations as well as they can possibly be done.

Pathogenic Bacteria and Protozoa
(Ninth Edition)

A Text-Book Upon the Pathogenic Bacteria and Protozoa. For Students of Medicine and Physicians. By Joseph McFarland, M.D., Professor of Pathology and Bacteriology in the University of Pennsylvania. Ninth edition, thoroughly revised. Octavo of 858 pages with 330 illustrations, a number of them in colors. Philadelphia and London: W. B. Saunders Company. Cloth, $4.75 net.

McFarland's Bacteriology has been one of the standard works on general bacteriology for nearly a quarter of a century, or since the science of bacteriology was in its early youth. Frequent revisions have kept it thoroughly up-to-date, a prerequisite for a work on a science developing so rapidly as the science of bacteriology has.

A constant effort to improve it has made it better with each revision until it

(Continued on page 300)

DEPARTMENT OF

SWINE PRACTICE

Edited by A. T. KINSLEY, M. Sc., D. V. S.

Contagious abortion in swine is becoming wide spread, and during the past year has taken a heavy toll of pigs in several states, in some sections as high as thirty per cent of the pig crop. Little is known concerning it, and it is important that investigations be pushed as rapidly as possible. I will appreciate it very much if readers will send me aborted pigs (one from a litter). It is essential that these pigs be packed in borax and shipped within a few hours of birth, otherwise decomposition will interfere with the laboratory and cultural examination. Send pigs from all aborted litters whether the abortion is due to infection or other causes. Mail such history as is available when the pig is shipped. Address correspondence and ship specimens to Dr. A. T. Kinsley, New Center Building, Kansas City, Mo. You will be promptly advised as to our findings with any suggestion we can give regarding your cases. Reports of our findings will be published from time to time in these pages.

Infectious Necrotic Enteritis

INFECTIOUS necrotic enteritis is a name applied to a disease or condition that is relatively common in swine and was formerly described as chronic hog cholera or an intestinal form of cholera. This condition is frequently designated as "mixed infection" or "intestinal necrobacillosis."

With the possible exception of hog cholera, this disease has probably been more prevalent than any other infectious disease of hogs in the corn belt of the United States during the last two or three years. It is the most common condition found in immunized swine in which the so-called "hog cholera breaks" occur. In fact, many veterinarians make no distinction between infectious necrotic enteritis and hog cholera. It has been experimentally demonstrated that infectious necrotic enteritis occurs independently of hog cholera, although it is a frequent complication of that disease. Swine plague and infectious necrotic enteritis are distinct disease conditions, although they frequently occur as associated conditions.

Pigs weighing 30 to 50 pounds are probably most frequently affected with infectious necrotic enteritis, although it may occur in recently farrowed pigs and in aged hogs.

Breed appears to make no difference as regards susceptibility to this disease. The condition of the swine undoubtedly is a factor in susceptibility; however, shotes in the best of condition become affected. Climatic conditions have little or no influence on the prevalence of infectious necrotic enteritis, although the disease appears to be more common in late spring and early autumn, probably because that is the season when the majority of the pig crop is at the most susceptible age. Sanitary conditions in which the swine are maintained have an influence upon the susceptibility of swine to the infection; however, the disease may prevail in swine that are kept in clean sanitary quarters. Food seems to have little, if any, influence upon the prevalence of the disease, although insufficient or poor quality of feed would no doubt predispose to this disease, the same as to any other diseased condition.

Etiology Not Determined

The specific cause of infectious necrotic

enteritis has not been determined. This condition is not the result of the filtrable virus that produces hog cholera, for it has been demonstrated by the injection of filtered blood from uncomplicated cases of infectious necrotic enteritis into swine that were susceptible to hog cholera, that the filtrable virus does not exist, at least in sufficient quantities or of sufficient virulence to produce disease. Experiments have demonstrated, although the findings are not positively conclusive, that the B. necrophorus is not the primary cause of this condition. Likewise, it has been rather conclusively demonstrated that the B. bipolaris suis is only a secondary invader in infectious necrotic enteritis. By a microscopic examination of the lesions in the intestine it is possible to demonstrate the B. necrophorus in an occasional case of this disease, the B. bipolaris suis in over 50 per cent of cases, the B. coli communis in practically all cases, the B. paratyphoid A and B in a few cases, and perhaps a variety of other microbian agents in various cases, but the principal incriminating evidence at this time is in support of the B. suipestifer as the principal or causative factor of infectious necrotic enteritis in swine. The B. suipestifer has been described as occurring normally in the intestine of healthy swine, but recent investigations by Jordan and Tenbroeck indicate that this organism does not normally inhabit the intestine of swine, and when found in normal animals its occurrence is looked upon as an indication of a carrier. The B. suipestifer occurs regularly in the intestinal lesion and in other tissues of affected animals, and it is possible that the final proof of this causal relation to infectious necrotic enteritis will be established in the not far distant future. It seems probable that intestinal parasites are an important predisposing factor, probably because of injury to the intestinal mucosa, thus providing a favorable field for action. The probable usual channel of entrance of the infection is in the feed or water, by way of the digestive tract.

Principal Lesions in Intestinal Mucosa

The principal lesions of infectious necrotic enteritis occur in the mucous membrane of the intestine. In some cases the lesions indicate that the infection begins in the lymphoid tissue (Peyer's patches and solitary follicles) of the intestinal mucosa near the ileocecal valve. The lesions may be found in any portion of the digestive tube, including the stomach, but are usually more extensive in the intestine. In the beginning the lymphoid areas become congested and tumefied and later undergo necrosis. In other cases the lesions are apparently not confined to the lymphoid tissue, but invade the mucosa which becomes congested, tumefied and necrotic. When large areas of the mucous membrane become involved the lesion appears as a diphtheritic inflammation, because of the adherent necrotic tissue. In some cases the entire intestinal wall appears thickened and friable, due to the accumulated necrotic tissue. Some cases are observed in which the necrotic tissue has sloughed, leaving the intestinal wall relatively thin and inelastic. In the prolonged cases or chronic form of this disease, the so-called "button ulcer" is of common occurrence. This lesion occurs when the infection is apparently localized in solitary follicles or in Peyer's patches, and the inflammatory and necrotic processes extend by continuity, the necrotic tissue remaining intact or accumulating as dirty brown masses with raised margins. Microscopically the surface epithelium in the affected areas and the lymphoid tissues are found to be in various stages of degeneration and disintegration. The degenerated and dead cells commingle with the coagulated inflammatory exudate and appear upon the surface as an adherent mass.

The mesenteric lymph-glands through which the lymph passes from the infected mucosa are tumefied and may be congested and hemorrhagic. In the subacute or chronic cases the central portion of the lymph-glands may be necrotic. The peritoneum adjacent to the involved intestine is invariably affected with a subacute or chronic inflammation. The peritoneal inflammation is manifested in the early stages by an excessive outpouring of serous fluid, but as the process continues there is a tendency to organization and limited fibrous proliferation which is prone to produce adhesions.

Complications Cloud Diagnosis

When complicated with the filtrable virus disease, the lesions of infectious necrotic enteritis and those that are attributed to hog cholera prevail. In the combination of the two diseases the lymph-gland lesions are more prominent than in infectious necrotic enteritis.

Infectious necrotic enteritis and swine plague sometimes occur simultaneously in the same animal, and the pulmonary lesions of swine plague will be noted in addition to the lesions of enteritis.

Those cases of infectious necrotic enteritis complicated with paratyphoid infections are sometimes difficult to differentiate from the lesions occurring in hog cholera and infectious enteritis. The involvement of the peritoneum is probably more intense in paratyphoid infections and the adhesions more marked.

Symptoms Variable

The symptoms of infectious necrotic enteritis are variable, and the intensity of the symptoms manifested is not proportioned to the intensity and extent of the lesions. Hogs apparently in the best of health may reveal lesions indicative of a chronic infectious enteritis on autopsy, and swine manifesting the usual symptoms of this disease may show very limited lesions on autopsy. The infection acts more rapidly and is more destructive in some cases, and is slow-going and rarely fatal in other cases, but with our present knowledge it does not seem advisable to attempt a symptomatic classifiction of this disease into acute and chronic types.

Usually the first symptom noted is depression. This disease may affect only a few animals in a herd, or a few animals may be affected at one time and they either die or recover and others in the same herd become infected, the disease thus ultimately affecting all swine on a given farm. In other instances practically all of the swine show evidence of the disease at the same time. They are dull and separate themselves from the other swine. The appetite is diminished although this may not be noted by the caretaker. In some outbreaks the first evidence of the disease noted is the general dullness. The owners will report that a large percentage of the hogs lack activity and appear dull and depressed. As the disease progresses digestive derangements become more evident and are manifested by irregular appetite and diarrhea. The affected individuals at this stage appear unthrifty, have rough coats, and arched backs. The fecal discharges are quite fluid and of variable color, depending upon the feed. The affected individuals become emaciated, thin and weak, and may die of exhaustion or they may ultimately recover. The temperature varies from normal to 105 or 106° F. during the active stage of the disease, but in the later stages it is not unusual to record subnormal temperatures. In uncomplicated cases, no pulmonary disturbances are manifested.

Course Irregular

The course of the disease is very irregular. In some cases it runs its course in a few days and in other instances individual animals may be affected for several weeks.

Autopsy Required for Identification

The identification of this disease requires an autopsy of one or more cadavers. The characteristic lesion upon which judgment is based occurs in the intestine and consists of an inflammation in which some of the involved tissue has become necrotic and is adherent to the intestinal mucosa. The finding of these lesions when coupled with a definite history of the outbreak and observation of the leading symptoms—irregular appetite, diarrhea, dullness and variable temperature—are usually sufficient evidence upon which to base a positive diagnosis.

Differential Diagnosis

Although it is not difficult to make a diagnosis of infectious necrotic enteritis it requires careful consideration to exclude other diseases or identify complications. In differentiating infectious necrotic enteritis from other infections, it is essential to carefully consider the history and symptoms as well as lesions. Hog cholera invariably has a sudden onset, a large percentage of a herd are simultaneously affected, and anorexia is a prominent symptom. Whereas, infectious necrotic enteritis has a relatively slow onset, and the affected animals have irregular appetites. If hog cholera and in-

fectious necrotic enteritis occur simultaneously, the history and symptoms would typify hog cholera and it would be necessary to identify the combination by the lesions revealed in autopsy, which would consist of petechial hemorrhages in the lung, subserous structures, kidney, bladder and spleen and congestion of the skin and hemorrhages in various lymph-glands which typify cholera as well as the lesions of infectious necrotic enteritis in the intestinal mucosa and peritoneum.

Swine plague of the septicemic or pulmonary type is relatively common, and may occur independently or as a complication of infectious necrotic enteritis. The septicemic form of swine plague has a sudden onset and rapid course. Many animals are simultaneously affected and the lesions consist of submucous and subserous hemorrhages, congestion of the skin and lymph-glands, and in some instances there is pulmonary edema. These clinical and postmortem findings are sufficiently distinctive for the identification of this form of swine plague. If the septicemic form of swine plague and infectious necrotic enteritis occur simultaneously, the history and symptoms would characterize swine plague, and the existence of inflammatory necrotic intestinal lesions would identify infectious necrotic enteritis. The pulmonary form of swine plague is characterized by cough and dyspnea in various degrees which are sufficiently distinctive from symptoms of infectious necrotic enteritis that diagnosis should not be difficult. The simultaneous existence of the pulmonary form of swine plague and infectious necrotic enteritis will evidence a combination of symptoms indicating involvement of the thoracic and abdominal organs, but an autopsy will reveal an atypical catarrhal pneumonia in which there is an interlobular infiltration and there may or may not be a fibrinous pleuritic lesion typifying pulmonary swine plague, and in addition there will be found intestinal lesions characterizing infectious necrotic enteritis.

Parasitic pneumonia occurring separately or as a complication of infectious necrotic enteritis is sufficiently prevalent to be given consideration in differential diagnosis. The uncomplicated cases are characterized by pulmonary symptoms which are sufficiently distinctive to safely exclude infectious necrotic enteritis. A combination of parasitic pneumonia and infectious necrotic enteritis may be identified by the demonstration of parasites in the lung lesions and by the inflammatory necrotic lesions in the intestine.

Paratyphoid Infections

Paratyphoid infections occur in swine, but the symptoms and lesions produced have not been positively determined, verified and recorded. It is probable that paratyphoid infections occur most frequently in garbage-fed hogs. Accumulation of dark-colored blood in the skin and subcutis producing the "blue belly" is probably a characteristic lesion of paratyphoid infection. The spleen is usually extensively enlarged. By a careful consideration of the foregoing paratyphoid infection may be identified.

Prognosis Should Be Guarded

The prognosis should be guarded. If the infection is relatively mild the percentage of deaths will be small but the loss of condition of the affected animals may occasion an extensive economic loss.

Sanitary requirements are frequently ignored by the hog feeder and breeder. Although infectious necrotic enteritis may occur in swine that are maintained in clean pens and properly housed it is far more prevalent in swine that are kept in mud and filth. There is a tendency among the larger feeders to keep too many hogs in one lot, a custom that is conducive to the rapid spread of any infectious disease. Those that are most successful in swine husbandry carefully watch their herds, and the first indication of any defect or disease is sufficient cause for isolation of the affected animal.

Quarantine is the first principle in controlling the spread of infection, and to be most effective, isolation should be absolute. Rigid enforcement of quarantine regulations in the early stages of infectious necrotic enteritis will materially diminish the losses occasioned by this disease. Stocker hogs that have been purchased and immunized at market centers frequently become affected with infectious necrotic enteritis. Shipped-in stocker hogs or breeding hogs should be

kept in quarantine for three weeks.

Slop foods of good quality should be provided for the affected animals. They should be kept in comfortable quarters and the droppings should be gathered daily, disinfected and properly disposed of. All dead animals should be burned or buried sufficiently deep and limed to destroy infection.

Prevention Better Than Cure

The indications are that infectious necrotic enteritis is due to microbian invasion of the intestinal mucosa and the production of an inflammatory necrotic lesion. It seems probable that the B. suipestifer is the primary causative factor: however, a host of other microbian agents are always present and no doubt are factors in this disease. In the control of the B. suipestifer, which is probably the specific cause, including the sources of infection and avenues of entrance, the associated microbian agents will be of no consequence. The B. suipestifer, according to recent experiments, does not inhabit the intestine of normal swine, and its presence therefore indicates a carrier or a diseased animal. The organism is eliminated in the fecal discharges, and soils, feed and water become contaminated. Pens, lots, sheds and runs that have been occupied by diseased animals should be thoroughly cleaned, and the litter properly disposed of and disinfected before other animals are placed therein. Intestinal parasites predispose to infection with the B. suipestifer, and all swine should be periodically "wormed out."

Various biologic agents claimed to be of value as immunizing agents are available. The B. suipestifer produces an endotoxin, and it is probable that an opsonic immunity can be produced by a bacterin made of the B. suipestifer. The reports from the successful use of such a bacterin may be found in practically all veterinary journals. Most bacterins recommended for prevention of infectious necrotic enteritis include the B. suipestifer, suisepticus, coli communis, paratyhoid and the B. of Gaertner. Such products are usually marketed as "Mixed Bacterin (Swine)". Extensive losses in stock hogs that have been simultaneously immunized against hog cholera in public markets, have been due to infectious necrotic enteritis. According to reports, the losses in stock due to this disease have been materially diminished by the use of mixed bacterin, administered when the swine are immunized against cholera, and the losses were reduced to a minimum in those shipments in which a second injection of the mixed bacterin was given five to seven days after the first. The administration of bacterin is advisable to all exposed swine on a farm, and some practitioners claim to have produced beneficial results by the use of bacterin as a curative agent.

Affected swine should be provided with easily digestible slop foods and placed in comfortable quarters. Intestinal antiseptics are indicated. The antiseptic selected should be such as can be administered in the slop. Copper sulphate is probably as efficient as any other and has the advantage of being relatively cheap. From one- to two-dram doses may be administered daily in the slop, or if the affected animal does not eat, the copper sulphate could be given in capsules. Some practitioners advocate the use of mixed bacterin, repeating the dose in five to seven days.

SALICYLATE OF SODIUM RECOMMENDED FOR RHEUMATIC CONDITION

The following is a brief history of a herd of hogs I saw today that presented what, to me, were unusual symptoms. The trouble, to all appearances, was muscular rheumatism, but the number affected was greater than I have ever seen so affected.

About three weeks ago, only one sow was noted to be lame, since then eight or ten sows have become affected, all showing acute lameness in one or more legs. This lameness has increased until at the present time three sows are unable to stand. Some three or four of the others show improvement. All the sows have pigs from two to three weeks old, none of which have shown any symptoms of disease.

In a bunch of fifty 100-pound shoats, some five or six are affected similarly. These shoats have access to a wheat field and are kept separate from the sows. Both sows and shoats are fed shelled corn, a little tankage and grass, and also are allowed to run in wheat fields. All have

had dry, clean quarters at night. No articular swelling is present, and no cough, fever, or systemic symptoms of any kind are discernible. Neither were there any lesions on the affected limbs. One shoat died about two weeks ago, but it was not known to be affected. No other deaths have occurred.

If you can formulate an idea from the meager description given, of the probable cause of the condition and suggest a treatment, if such be practicable, I will greatly appreciate the courtesy.—J. L. W., Mo.

REPLY: Relative to the swine that you mention, I am at a loss to know just what the source of the disturbance might be. You describe typical rheumatism, so far as symptoms are concerned, but the surroundings and method of caring for these swine, as per your letter, would indicate that they had had the best of care, and consequently had not been predisposed to rheumatism.

I would suggest that in the corn or slop, you administer salicylate of sodium, as it will do no harm and if the condition is of rheumatic origin, it will be beneficial. In some rare instances hog cholera causes rheumatoid symptoms, but from your description I am led to believe that this condition is relatively chronic and therefore hog cholera would be eliminated.—A. T. K.

INDICATIONS POINT TO ACUTE CHOLERA

I have had some trouble with hogs lately that I would like to have some information on.

Case 1. While feeding his hogs in the evening, the owner noticed that two were vomiting. The next morning 11 hogs were dead. They ranged in size from 35 lbs. to 200 lbs., the larger ones being old sows. I was called, and as one had just died when I arrived, I held an autopsy on it and also on two others. Even in the one that had just died the stomach was greatly distended with gas; there was very marked gastritis, hepatitis, and a few petechial hemorrhages in the kidneys—all the other organs being normal. These hogs were running on a small pasture and in a wheat field, and the stomach contents showed only grass, wheat, and a little corn. I diagnosed the case as forage poisoning and had the rest of the herd put into a dry lot for a few days, with plenty of slop and a little corn, then changed them to a different pasture. One more died that same afternoon, but there has been no further trouble.

Case 2. The owner of 175 hogs, ranging from 75 to 150 lbs., lost two yesterday and five last night and this morning (May 3). I got there in time to see one before he died, death occurring about two hours after they noticed him off. The temperature of this hog was subnormal; he vomited a great deal; went down and when forced would not try to get up, convulsions and death followed shortly thereafter. The post mortem lesions were the same as in the above-mentioned case, with the exception of the stomach contents which consisted of considerable white clover and a little corn and grass. These hogs were running on blue grass pasture that has been used for hogs for years. One of the hogs was vomiting when I left, but the rest of the herd seemed to be all right. I advised the same treatment as for the other herd.

This appears to me to be forage poisoning, but I don't know from what plant, and as it is the first instance of the kind I have had since I have been in practice, I am seeking information, and hope that you can enlighten me on the subject.—J. K. W., Mo.

REPLY: You did not state in your letter whether or not the swine in question had been immunized. This particular point I would seriously consider. You have described, with one exception, the typical symptoms of acute cholera in the beginning of an outbreak, and if there is any question as to the immunity in these swine, I would certainly recommend their immunization, using serum and virus, the latter being used on those cases in which there is no rise of temperature.

There is one plant that is poisonous for swine and common in this season of the year, namely, cocklebur.—A. T. K.

Engraved cards announcing the opening of new offices at 30 East 42nd St., New York City, were sent out May 1st by Dr. Cassius Way, who was for many years chief veterinarian of the Borden Condensed Milk Company. Doctor Way will specialize in milk sanitation, dairy herd efficiency and breeding diseases of cattle and horses.

DEPARTMENT OF

CATTLE PRACTICE

Edited by JOHN FRANCIS DE VINE, D. V. S.

Sterility

(Continued)

IN the previous articles I have discussed some of the causes of irregular breeding and sterility in cattle. The relief of these conditions is at the present time, perhaps one of the most talked of, and of greater interest to the rural practitioner than any other one subject. This is probably due to the fact that more practical knowledge has been obtained on remedying these troubles during the past decade than perhaps in all time previous.

One of the earliest and ablest workers in this country on the subject was Dr. W. L. Williams. His splendid investigations and publications making it easier for others to take up the work, consequently we all should, and do look upon him as *the* pioneer and *the* authority on this subject in this country.

Another thing that has perhaps promoted interest in this work is that our bovine animals have increased so enormously in value, making it possible and profitable for an owner of a choicely bred animal to pay more for veterinary service on that single animal than he might have been willing to pay for veterinary services on his entire herd in the past.

In my sterility work I seem to differ so pronouncedly in theory and practice on some of its phases with other workers and writers, that it might be well in the beginning of this discussion to call attention to these particular things, at the same time giving the views of others and thus leave the reader free to follow his own choice. I hope my readers will be gracious enough not to look upon these expressions as egotistical, but rather with a view that a writer is entitled to set forth his honest views as he sees and believes.

FIRST: In discussing the technic we find that various authors explain that to handle the internal genitals they should first be brought back into the pelvic cavity by grasping the external cervix with forceps or hooks, stating that this not only makes handling of the uterus, ovaries and tubes easier, but has the added advantage of permitting observance of the cervix, the inspection of which gives reliable knowledge as to its condition and that of the uterus.

As to the use of instruments for drawing back and fixing the uterus, I use them in less than five per cent of my examinations of cases. I am quite sure all will agree that their use is of no special advantage to the cervix, and I know of several instances in which they have been harmful. I was recently called to see a herd in which seventeen virgin heifers had been treated by fixing the cervix and irrigating the uterus before breeding; twelve of them developed such a profuse discharge and such a pronounced vaginitis and vulvitis as to alarm the owner and caretaker. Examination revealed that in addition to these observable disturbances, most of the heifers suffered from a cervicitis of varying intensity.

As to the advantage of drawing every cervix back for viewing, I personally believe it is of little value. If examination with the fingers reveals a condition that suggests the advantage of ocular examination, well and good; but if an operator can not determine fairly accurately in most cases, the condition of a cervix by manipulating it, in its normal position and free from hooks or forceps, which are always in the way, I would not give much

for the opinion of such a man after he had viewed the cervix to his entire satisfaction. The physical appearance, including color, of what appears to be an apparently normal cervix, or to put it another way, the cervices of animals that conceive, vary so greatly that after we have examined a few score of them we would be much in the position that Pat was, when he saw the track of a snake leading to a hole; after he had pondered over the matter for a long time, and viewed it from all angles, his conclusion was that he did not know whether the track made by the snake was made "when it was going in or coming out".

Irrigation of Empty Uterus Opposed

SECOND: As to irrigating an empty uterus with the hope of stimulating or regulating ovulation or for any other purpose, I am not in favor of such procedure excepting in a case now and then where special conditions warrant it. I think it is generally known that I am in favor of irrigating a recently pregnant infected uterus and in cases of pyometra and severe uterine catarrh, but the irrigating of an apparently normal uterus, to influence ovulation is a reversing of the true condition. The ovary is one of the endocrin or ductless glands; it is the ovary that influences menstruation of the deciduous uterus and it is generally conceded by authorities, *that its function is that of controlling menstruation and preparing and sensitizing the endometrium for the reception of the impregnated ovum*, and in no branch of human medicine have greater strides been made during the past few years, than in the results that are being obtained from the administration of ovarian and corpus luteum extracts, either for their influence on metabolism or for the correcting of functional derangements of the internal genitals. This, too, after years of experimental uterine surgery have miserably failed in relieving these conditions. And still another and all important argument is that in practice ovarian treatment is simpler, safer and more effective as a whole than uterine treatment, with the added advantage that the specialist does not need to take this work entirely out of the hands of the local practitioner, some of which rightfully belongs to him, but from simplicity in technic, the local practitioner can give daily attention to certain cases when they need it, which would be impractical for a specialist worthy of the name to do, both because of the need of keeping other appointments and because of the excessive expense to the client.

Advantages of Normal Right Ovary

THIRD: So far as I am aware, other workers have made no distinction as to the advantage of a normal right ovary, tube and horn, as compared to a normal left ovary, tube and horn.

In examining something over 1,600 pregnant animals, I have found less than 9 per cent pregnant in the left horn. I have likewise examined hundreds of cases with a history that periods of estrum had been more or less regular for months or years without conception. An examination would reveal a corpus luteum in the left ovary, but no evidence of functioning of the right, it perhaps being too large, too soft, too hard or cystic, etc. If the conditions existing were correctable, the animal would conceive promptly as soon as the right ovary began to function.

This is the history of Langwater's "Dairymaid", one of the world's most famous Guernsey cows. She was sterile nearly four years, with a history of irregular heat periods, and an examination disclosed the cervix, uterus and horns normal, degenerated corpus luteum in the left ovary, the right ovary about four times its normal size and as hard as a fibrous tumor. Four thorough massagings, spread over a period of about two months, softened the right ovary; it began to ovulate again and the cow conceived at once.

We not infrequently see similar cases of

Veterinary hospital of Dr. J. B. L. Terrell, Dresden, Tenn.

sterility in which all organs are normal, with the exception of a salpingitis or atresia of the right tube. At this time I know of a rather famous dairy cow in which this condition has existed for nearly two years, since her last calf, but she is too valuable to condemn outright, since she has a splendid right ovary which ovulates regularly and there is ever the possibility of an ovulation of the right ovary dropping into the peritoneal cavity and finding its way into the left tube for fecundation.

NEGLECT IN CARING FOR INFECTED UTERUS LEADS TO FATAL RESULTS

Please give me your opinion on the following:

A client of mine has a herd of Jerseys that I suspect has contagious abortion in it. Recently two cows aborted, and I gave the owner some 10-grain tablets of potassium permanganate to be used in three gallons of warm water as a uterine douche. He has an irrigating outfit which he used a few times, and then after three or four days had elapsed, douched them again.

The next day both animals were very decidedly prostrated. They showed the same symptoms: extreme weakness, normal temperature, very weak pulse, and dejected appearance in general.

Stimulative treatment was given, but one died that night. The other one is recovering but still weak. I did not get to hold a postmortem examination. Could that much potassium permanganate have caused toxicity? I don't believe it could, but I do not know what else could have caused it.—W. A. B., Illinois.

REPLY: Your experience is only another instance which testifies to the dangers I have repeatedly taken special pains to point out, in caring for an infected uterus.

The permanganate solution used was not the cause of the unfortunate results. In the first place the probabilities are that the owner was not capable of properly douching the uterus, and if capable, he should have continued to douche them every day, instead of allowing three or four days to elapse, during which the infection extended so into the walls of the uterus that he could easily have thrust his hand or a tube through the walls. This is probably what he did in the case of the cow that died so promptly. My advice always is if a uterus cannot be cleansed while it is strong, then leave it alone entirely and resort to internal medication, with the hope of helping the cow constitutionally. If the uterus has involuted considerably and the putrid mass is confined to a comparatively small area then uterine capsules are of value and should be used.—J. F. D.

PARALYSIS DUE TO FORCED FEEDING AND LACK OF EXERCISE

I would be glad to have advice on the following cases:

Subjects: Two pedigreed shorthorn bulls, ten months old, forced for sale and show from birth, weight at ten months, 950 pounds. They were never out of the box stall, cows brought in to be suckled, fed bran shorts and barley chaff with oat bundles and hay.

Symptoms: Slightly enlarged hock joints, knuckled at fetlocks. In a couple of days, they went down and would not rise. Sensation was present in all parts and they could move their legs at will. They could crawl around the stall and turn themselves at will. Temperature, pulse, respiration, appetite and bowels normal.

Diagnosis: Softening of bone due to lack of exercise and lack of bone-forming elements in food.

Treatment: Slings were tried, but the animals lay as dead weight in them, so I let them down. They were given lime water to drink, with syrup of iron quinin and strychnin phosphate, one-half ounce, three times daily.

In two weeks one had improved slightly; the other had injured hocks on the floor till the calcis protruded, and was killed.

It is not possible for me to see the remaining animal very often, but I do not expect very satisfactory results in him, as he will not try to stand in a sling and will probably go as the other one did in time.

My advice to the owner is chiefly to guard against a recurrence.

Would other treatment have been more successful?—H. A. T., Sask.

REPLY: I do not think there is a chance for a doubt but what the forced feeding and lack of exercise was the cause of paralysis in the two young steers, and after

they had gone down and stayed down several days their chances for recovery decreased.

It is impractical to sling the ox. No arrangement as yet has ever been figured out to sling an ox with the same effectiveness as we sometimes sling a horse. On the other hand, we know how disastrous it is for the horse to remain in a recumbent position for any length of time; while a bovine if well bedded, turned frequently, and fed properly, may lay around in a stall a month or more without much inconvenience or many bedsores, and perhaps in the end recover quite completely.

It would be a difficult matter in this case to say which tissue suffered the severest and caused the paralysis; personally I would suspect a synovitis of the hocks and possibly fetlocks as playing an important part in the paralysis. I doubt if the bone tissue proper had much to do with it. I do not think, however, that the motor nerve tissue could be excluded, and if involved nux vomica in large doses should be of value.

I consider your treatment of the animal and your advice to the owner quite right. He reared his calves under such abnormal and artificial conditions that it is no wonder nature revolted and refused to produce a normal animal under the conditions imposed.

In my opinion the most that your client can get out of this experience is the knowledge that a modicum of common sense pays mighty big dividends in the handling of live stock.—J. F. D.

Queries and Answers

Is Black Tongue of Dogs Hemorrhagic Septicemia?

BLACK tongue is a term originated by the laity and applied to a disease of dogs, especially affecting the collie, hound and bird types of dogs over two and one-half years of age. In the United States it occurs in the South where the name black tongue originated. A similar disease has been reported on the western coast under a different name.

The disease occurs periodically in an epizootic form, characterized by severe symptoms of gastro-intestinal inflammation and complicated by ulcerative stomatitis.

The exact etiological factor so far has not been determined. Various causes have been advanced, the one most commonly discussed being ptomain poisoning. However the nature of the disease is not so suggestive of ptomain poisoning, or of hemorrhagic septicemia, and in the opinion of the writer, it belongs to the hemorrhagic septicemia group of diseases.

Studying the etiology from a bacteriological point of view, it was found that a microorganism of the bipolar type was present in all cases observed. This organism may be isolated from the ulcers in the mouth or from the blood of the heart, and proves pathogenic to rabbits in eighteen to twenty-four hours. A subcutaneous injection of five mils of a bacterial suspension in a dog caused necrosis of the skin at the point of injection, the animal became greatly emaciated and death occurred in three and one half to four weeks. The organism was recovered and caused death in a rabbit in twenty-four hours. Both cultures fed to another dog developed the disease within a week, while cultures fed to two other dogs did not cause the disease.

The above experiments demonstrated that artificial transmission gives variable results, and while additional experiments are necessary in order to make definite statements, the bipolar organism is at least to be suspected.

Many veterinarians are of the opinion that black tongue is a disease peculiar to

the South and of very obscure nature; however, after observing many cases, and contrasting it with typhus of dogs, or Stuttgart dog disease as described in Hutyra & Marek, Volume 1, page 211, I firmly believe they are the same disease.

Furious Rabies. The Man on the Reader's Right is Dr. C. A. Zell.

The description of the symptoms, anatomical changes, course and prognosis of so-called black tongue cannot be given clearer than it is given in Hutyra & Marek, from which I quote:

Anatomical Changes

The autopsy established in all cases severe inflammatory changes in the digestive tract. The mucous membrane in the entire stomach and in the duodenum, is greatly swollen, corrugated, and of a blackish-red color. Its surface shows numerous hemorrhages, varying in size from that of a lentil to a pea, and is covered profusely with mucous or with a chocolate brown, semi-liquid mass which has an alkaline reaction (exceptionally fresh blood may be also present in the stomach). Similar, but less plainly marked inflammatory changes, are present in the intestinal canal, especially in the small intestines and in the cecum. The peritoneum over the stomach and the intestines is markedly injected, the mesenteric lymph-glands, and to a greater or lesser extent the spleen also shows acute swelling. The liver and the kidneys are hyperemic, the latter also containing small hemorrhages. The bladder is usually distended, its mucous membrane is usually smooth and pale red. The lungs show only hyperemia and acute edema. The muscle of the heart often tears easily, and on the cut surface it is sprinkled with butter-yellow streaks. The brain and its meninges are hyperemic. The buccal cavity frequently contains inflammatory as well as necrotic changes (see symptoms).

Symptoms

The disease almost invariably commences with sudden vomiting, which usually attacks the animal while eating or drinking, and which may reappear very frequently. The vomited material consists of remains of the ingested food or water stained yellow by the bile, but may later become bloody. From this stage on, the animals refuse to eat, or they accept food unwillingly; on the other hand they drink water very frequently and feverishly. There is first constipation, but later diarrhea appears.

The animals are greatly depressed from the beginning of the disease, and are unwilling to move about, and in doing so they manifest a staggering gait. They show indifference to their surroundings, which condition later develops into great dullness and sleepiness. The animals become greatly emaciated as a result of the frequent vomiting, and persistent inappetence, and the disease develops in its characteristic form in from three to five days.

The conjunctivae show a brownish-red-discoloration, are greatly injected, the eyeballs are sunken in their sockets, the pupils are dilated. The nasal mucous membrane is of a similar color and dry.

The mouth emits a very unpleasant penetrating odor, which sometimes may be noticeable at a great distance. The buccal mucous membrane is dry, dark brownish-red, and covered with a tenacious coating which is at first gray, later thick and chocolate brown; this coating is especially noticeable on the tongue. Later the mucous membrane loses its luster in spots, these areas soon changing into erosions, and becoming covered with pale yellow or dirty brown, tinder-like scabs; sometimes they are surrounded by bright red inflammatory tissue. These lesions are principally observed on the inner surface of the cheeks opposite the rows of teeth, on the gums, in the corners of the mouth, on the inner surface of the lips, especially in the region of the corner teeth, and on the borders of the lower surface of the tongue. Later the scabs drop off and in their place dark red ulcerations appear, which are covered with tissue shreds or with a dirty brown debris. In severe cases the ulcers may confluate forming large ulcerative areas, while the tongue may change into a dry, chapped, frequently entirely insensitive shrunken body.

The abdomen is very sensitive, especially over the region of the stomach, and it is either bloated or drawn up; loud persistaltic sounds may be heard when close to the animal. The

Rabies. In the South This Disease is Sometimes Called Black Tongue.

movement of the bowels is at first retarded, sometimes the animals after severe straining, pass balls of feces covered with mucous or blood, which may also contain blood; in other cases again severe diarrhea may appear, the feces being fluid, bloody and very fetid. The mucous membrane of the rectum is occasionally greatly inflamed, very painful and exceptionally ulcerated also. The body temperature is usually normal, but toward the end of the disease it sometimes drops below normal. The heart's action becomes accelerated in the later stages of the disease, being weak and beating arhythmically. The respiration is quiet, and deep, exceptionally, however, in the presence of pneumonia it becomes accelerated. The urine which frequently can be passed only on pressing the greatly distended bladder, contains in severe cases a great amount of albumen, and more or less bile pigment. In some cases chronic spasms of the muscles of the head, or over the entire body, may be present.

Course and Prognosis

The average duration of the disease is usually from eight to ten days; in most severe cases the animals usually die in from four to six days, exceptionally, however, death ensues toward the end of the second day. The rate of mortality fluctuates between wide limits of different epizootics. In the beginning of an outbreak sometimes almost every animal dies, while later the course of the disease becomes less and less severe. A very rapid development of the disease, complete inappetence, profuse diarrhea and great debility indicate unfavorable terminations, whereas a slow course and mild symptoms warrant hopes for recovery. Young animals are more apt to withstand the disease than older ones.

In favorable cases the animals sometimes recover entirely within a short time, even the ulcers in the mouth heal with remarkable rapidity; as a rule it requires from two to three weeks for the animals to regain their former appetite and disposition. The recovery is usually complete; permanent sequelae develop only in exceptional cases (paralysis of a posterior extremity, deafness).

Schiebel of Frankfort and Zschokke of Switzerland both found an organism of the bipolar type in the blood of a dog suffering from typhus which resembled the organism of fowl cholera and swine plague. The cultural characteristics of the organism associated with black tongue are similar to those of Bacillus avisepticus and Bacillus suisepticus.

If black tongue and typhus of dogs are identical, which seems most probable, and although artificial inoculation gives variable results as is the case with hemorrhagic septicemia of other animals, would not hemorrhagic septicemia be a more suitable name for this disease?

I did not suggest the name of hemorrhagic septicemia, a name that seems to be used generally and often times misused as a diagnosis for most of the infectious diseases at this time, because of its popularity, but with all sincerity from personal observation I firmly believe this disease should be classed in the hemorrhagic septicemia group.

W. C. BURKHART.

State College of Agriculture,
Athens, Georgia.

REPLY: We think that black tongue in dogs and canine typhus as described by Hutyra & Marek, is generally regarded as identical among veterinarians doing any considerable canine practice. In fact, we do not recall having heard this disease referred to among canine practitioners as other than canine typhus or Stuttgart's dog disease for some years.

It is a mistake to speak of it as occurring only in the southern states in this country. It unquestionably was first recognized there and perhaps is still more prevalent in that section. Nevertheless, it undoubtedly occurs in every large city, and perhaps to a less and possibly often unrecognized extent in the country districts throughout the United States. In Chicago it has been common for at least a decade.

In Chicago, however, it has not shown the epizootic character that, according to Hutyra & Marek, it has shown in Europe, and the evidence that it is contagious or infectious seems to be exceedingly meager. It is uncommon for more than a few animals in a kennel to succumb to the disease, and in kennels where it does appear, cases are likely to occur at rather infrequent intervals. It is at least as common among family pets that associate but little with other dogs as it is in kennels or other places where dogs are in close association.

Of course, this disease may belong to the hemorrhagic septicemia group as Dr. Burkhart believes, but some of its characteristics are in such marked contrast to the characteristics of hemorrhagic septicemia as it occurs in other animals that it appears to the writer, doubtful if it bears any relationship to this group of diseases.

Hemorrhagic septicemia is preeminently a disease of animals whose resistance has been lowered in some way. As a prominent part of the history of almost every outbreak of hemorrhagic septicemia in cattle, sheep, swine or horses, we expect to find a history of some radical change of feed, some unusual exposure to incle-

ment weather, some hardship in handling, such as a long drive or a trip by rail, or some other condition that would markedly lower the vitality; and further, while hemorrhagic septicemia attacks animals of all ages, young animals seem more susceptible. With canine typhus, just the opposite is the case. We have heard of no cases appearing in dogs less than four years old and the older the dog, apparently the more likely it is to be attacked and a fatal outcome more probable. Outbreaks have been reported in which almost all dogs that were affected were ten years of age or older. As is the case with hog cholera and some other infections, vigor of the animal is no protection, nor does good sanitation and hygiene or good care affect the incidence or outcome of canine typhus.

Furthermore, in hemorrhagic septicemia, there is usually a very rapid extension of the disease, and if no means of control are instituted, a large percentage of the invaded herd is affected. Canine typhus never spreads rapidly, appears not to be communicated by contact at all, and its progress through a kennel is slow and unlikely to affect even in the course of months, more than 10 per cent of the animals.

EFFECT OF VERMIFUGES NOT EASY TO DEMONSTRATE

In giving worm capsules, I find that very few worms are expelled even where their presence has been proved by the autopsy of animals in the herd. Subsequent postmortem examinations show that the intestinal infestation has been overcome.

If the client could see numerous worms expelled, it would be more satisfactory to him and, for this reason, fortunate for the veterinarian. What would bring about this result? Apparently the vermifuge kills the worms and they are digested. If they could be killed and expelled instead, the ocular demonstration would go far to convince the farmer of the advisability of calling the veterinarian for worming his hogs.—G. A. H., Iowa.

REPLY BY DR. MAURICE C. HALL: A comparison of a really careful examination of the manure of animals which have been given anthelmintics, with a casual examination of the manure of such animals indicates that it is only by careful and precise methods that one can be sure of finding the worms present in manure. Where all the manure passed for several days after treatment is comminuted and washed through a suitable screen or set of screens, the worms are washed clean and are recognizable on close scrutiny, even when badly distorted or macerated. The condition of the worms passed depends largely on the nature of the host animal and its digestive tract. Worms expelled from dogs are usually quite recognizable and very little distorted; ascarids expelled from horses by the use of carbon bisulphid are usually very much macerated or digested; stomach worms from sheep, expelled by the use of copper sulphate solution, are usually so blackened, fragmented and macerated as to be barely recognizable; worms from swine are usually somewhat macerated, but not seriously so.

In view of the above, not too much can be expected from the casual examination of feces by the veterinarian or the farmer under the hampering limitations of hog-lot conditions. Poking about in the manure with a stick in a muddy hog-lot cannot be expected to give a great amount of information in regard to worms passed. Fecal matter conceals embedded worms and masks the appearance of those that project or are fished out; hence worms may be passed and overlooked unless rather numerous.

Purgation should always accompany anthelmintics, unless the anthelmintic is itself purgative, as areca nut, or unless actual test shows such purgation to be inadvisable, as in the case of carbon bisulphid administered to remove bots and ascarids from horses, where linseed oil diminishes the efficacy of the drug and may lead to superpurgation. A treatment for removing ascarids from swine which has been found satisfactory in experiments in the Bureau of Animal Industry is as follows: Fast the animals for twelve to twenty-four hours and give to 100-pound animals 1 dram of oil of American wormseed, immediately preceded by 2 ounces of castor oil. The mouth may be held open with two loops of wire or rope and the drugs administered with a spoon. Feed and water should be withheld for three or four hours after treatment.

It should be borne in mind in looking for worms in manure that all the para-

sites are not passed in the first twenty-four hours after treatment. Thus it has been found that dogs may pass ascarids through the seventh day after treatment, and hookworms, whipworms and *Dipylidium* through the fourth day; horses may pass ascarids for eight days after treatment and bots for seventeen days, the ascarids usually coming away on the second and third day and the bots being most numerous on the third or fourth day. In treating swine for worms, the manure of the second and third day should be examined.

TREATMENT SHOULD BE DIRECTED AGAINST THE MATURE ASCARID

Is there any medication that will reach the larval form of ascaris in the lungs of pigs and destroy it? If the development of the ascaris in the larval stage is allowed to continue unhindered, it seems to me that recovery from a severe infestation must necessarily be very slow, and, even if the pig does not die, the loss in condition and growth will be so great that so far as the owner's pocketbook is concerned, the animal might as well have died. That is, it must continue unthrifty for weeks, during which time it will consume high-priced feed at no small loss to the owner. —G. A. H., Iowa.

REPLY BY DR. MAURICE C. HALL: There is no medication known at present that would be effective against the larval worms in the lungs, so far as we are aware. However, the period during which a larval worm remains in the lungs is comparatively short, a matter of a very few days. If pigs are exposed to infection, there may be larval worms in the lungs most of the time, or all of the time, but owing to the short stay of any one of them, it would be necessary to repeat treatment continually, even if we knew of a satisfactory treatment. Therefore control measures must consist in the administration of anthelmintics to the entire herd to remove the worms from the intestine and the maintenance of sanitary conditions at all times. Hog houses and enclosures of every sort should be kept clean and the manure removed frequently and disposed of in such a way that the worm eggs present in it cannot get back to swine in feed or water. It is true that a severe pulmonary infestation will interfere with a pig's development and may kill it, but the remedy lies in routine anthelmintic treatment to remove the intestinal parasites and in sanitation, not in treatment for the transient pulmonary condition.

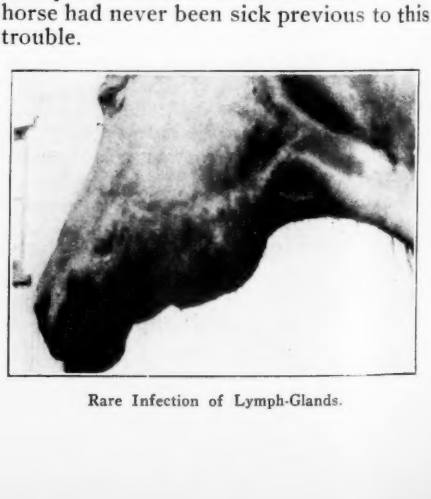
INFECTIONS OF LYMPH GLANDS

I have been treating a nine-year-old horse for about three months, seemingly without any beneficial results. The trouble seems to be an infected condition of the lymphatic glands of the head of about six months' standing and had been previously treated by another veterinarian. The glands are very hard and very much enlarged, breaking and discharging pus from time to time.

I have removed some of the glands, healing resulting in a very short time, but as soon as one gland is reduced to normal another becomes enlarged and the process has to be repeated. None of the other body glands seem to be involved.

Thinking it might be a case of glanders, I applied the mallein test but got no reaction. About a month ago, a condition arose resembling poll-evil. I had an autogenous vaccine made from the discharge and used it every four days. The poll-evil was completely cured, but the gland condition still prevails. I have used the iodin treatment internally and externally without avail. The animal has never missed a feed and his temperature is normal at all times.

The last time I called to see the animal, the swelling was so great as to seriously impair respiration, and it was necessary to introduce a trachea tube. The horse had never been sick previous to this trouble.



Rare Infection of Lymph-Glands.

I would be glad to have some suggestions as to the nature of the trouble and the proper treatment.—O. C. S., Ind.

REPLY BY DR. GEO. H. BERNS: Infections of the lymph-glands are fortunately of rare occurrence for they do not seem to yield to treatment.

I have seen them occasionally on the limbs of horses, closely resembling farcy and occurring without any known cause. In one case, multiple abscesses followed the introduction of a seton for chronic shoulder lameness, and after months of unsuccessful treatment the red hot iron was employed and every abscess thoroughly cauterized, which had the desired effect temporarily at least, for the case was lost sight of.

DISINFECTION OF FARM BUILDINGS

What is the best and most inexpensive drug with which to disinfect barns where contagious abortion exists, and how should it be used and how often repeated?—A. A. Z., Wisconsin.

REPLY BY DR. E. T. HALLMAN: I cannot give a direct answer to the above question, since there are a number of factors to be considered in the selection and application of a disinfectant. I know of no disinfectant that does not have some disadvantage, or that is entirely satisfactory for the purpose specified.

The coal-tar disinfectants are perhaps the most satisfactory. Compound solution of cresol is satisfactory, but there are several similar proprietary disinfectants on the market that have a higher phenol coefficient than compound solution of cresol, which can be used in higher dilutions and are cheaper. These preparations can be bought at a price that will average from one half to two cents per gallon when properly diluted for effective disinfection. For obvious reasons I cannot specifically name some of the preparations referred to.

There are three things to consider in the selection of these preparations, viz., the reliability of the manufacturer, the phenol coefficient, and the cost. The last two must be considered together in arriving at the cost of the solution when diluted for use. The effectiveness of the coal-tar preparations is greater when soft water is used for diluting them. The most serious objection to the use of these preparations in the dairy barn is their odor. Considerable care in their use must be taken to prevent the milk from absorbing the odor.

Quick lime is an efficient and cheap disinfectant though more troublesome to use. Air-slaked lime cannot be depended on as a disinfectant.

Another objection to the use of lime as a disinfectant is that it has a deleterious effect on the manure. Contrary to the opinion of many, the use of lime on manure is a bad farm practice.

The most effective way to apply a disinfectant is with a spray pump. A thirty-gallon barrel spray pump, mounted on wheels, should be a part of the equipment of every dairy barn. If one of the coal-tar disinfectants is used the barrel may be kept filled with the disinfectant properly diluted and always be available. If lime is used it should be slaked with water and sufficient water added to give a density that may be used in the spray pump. The lime, thinned with water, should be strained before placing in the barrel, and no more should be made up than is expected to be used immediately, as it deteriorates on exposure to the air.

As to the frequency of using a disinfectant in the barn, it may be stated that periodic stable disinfection to the exclusion of daily cleanliness in barn and herd management probably accomplishes very little in fighting infectious abortion. In well lighted barns with cement floors, daily use of the manure fork, broom and water on the floors leaves little to be accomplished by the use of disinfectants. Where the floors are not cleaned daily with broom and water, even disinfection of the floors once a week is not much protection in so far as the spread of abortion is concerned. In infected herds the floors are being constantly infected with the abortion bacillus, and only daily cleanliness in the care of the floor will accomplish much. In infected herds, the use of maternity stalls for aborting and parturient cows, these stalls to be disinfected as frequently as the bedding is changed, daily cleaning of the floors with broom and water, frequent cleaning of the walls with water, and the daily use of

a disinfectant in the gutter where discharging cows are left in the herd, will accomplish a great deal more in the fight against infectious abortion than periodic barn disinfection.

NEED OF ANTHELMINTIC TREATMENT OF SWINE EMPHASIZED BY RECENT DISCOVERIES

Now that we have additional information on the life history of the *Ascaris suum*, should our standard treatment for animals infested with this parasite be modified and, if so, how?—G. A. H., Iowa.

Reply by Dr. Maurice C. Hall: The only thing in the new findings with regard to the life history of ascarids that calls for modification of treatment is the recognition that pneumonia and "thumps" may be due to ascarid larvae in the lungs. The realization of this may lead to an accurate diagnosis of the condition in cases where one might otherwise be misled and institute unsuitable and ineffective treatment or resort to symptomatic treatment. The new findings emphasize the need for anthelmintic treatment by showing that ascarids are more dangerous than has been thought heretofore. The findings show that not only are there pulmonary lesions to be charged to these worms, but incidentally they have also developed the fact that the injury to young animals is greater than is generally thought in other respects, and that such animals are markedly stunted in growth as a result of gross infestations.

BACTERIN TREATMENT OF HEMORRHAGIC SEPTICEMIA IN SHEEP

I have a condition here which, to the best of my knowledge and belief after carefully studying Baker's "Sheep Diseases" and articles by the same author in the Journal, is hemorrhagic septicemia. I sent specimens to a laboratory for examination and my diagnosis has been confirmed; but, I am not able to get good results from the use of hemorrhagic septicemia bacterins, which, from all reports, is unusual if hemorrhagic septicemia is what I actually have to deal with.

Recently I vaccinated a bunch, in which eight sheep were showing clinical symptoms. Four of these have already died, and I believe the remaining four will not survive. It is gratifying though that there has been no extensive trouble in this flock. That is, that none of the animals given the bacterins when they were apparently well have become sick.

I should like to have answers to the following questions:

1. When should I revaccinate? I gave these animals a single injection about six weeks ago.

2. How often should I vaccinate and when will the treatment need to be repeated? That is, will the immunity conferred by the vaccination, if any, last for life.

I can't overlook the possibility that this outbreak of hemorrhagic septicemia is in some way connected with chicken cholera which is present on this place and has been for a couple of years. I vaccinated all the sheep, hogs, goats and cattle on the place with a hemorrhagic septicemia bacterin made from organisms of bovine origin, since I understand there is little difference in these organisms in the various species of animals, and that the bacterins made from organisms of bovine origin is likely to be just as effective for horses and hogs as one made from organisms of equine or swine origin,—R. T. D., Texas.

Reply by Dr. H. J. Shore: 1. If the animals are to be revaccinated, it is good practice to do so in from five to seven days after the first vaccination, provided there are no visible symptoms of severe reaction.

2. The immunity conferred by vaccination with bacterial vaccines in the case of hemorrhagic septicemia is of unknown duration. Generally speaking, however, it is believed that the immunity will last for a considerable length of time, often during the life of the animal.

It is possible that the outbreak of hemorrhagic septicemia among the sheep may be connected with chicken cholera which is prevalent on the place, as such outbreaks have been reported. Also, the use of hemorrhagic septicemia bacterin prepared from cultures of B. bovisepticus will confer some immunity against other types of the B. bipolaris septicus group, as it is well understood that the several types are closely related. However, if the best results are to be obtained, the vaccine should be prepared from cultures of organisms of hemorrhagic septicemia obtained from an

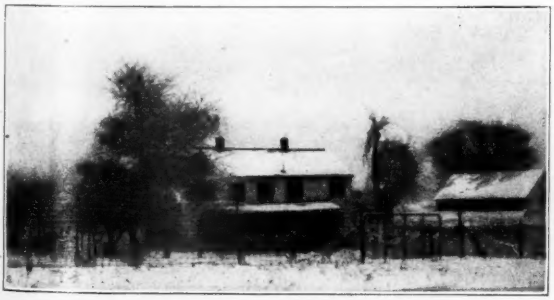
animal of the same species as that to which the animals to be treated belong. That is, if a bacterial vaccine is to be prepared for use in protecting sheep against hemorrhagic septicemia, the organism employed should invariably be isolated from sheep affected with that disease. This is well set forth in the Bureau of Animal Industry's bulletin on hemorrhagic septicemia (E.B.1018).

Department of Surgery

By DR. L. A. MERILLAT

A Plea for the More General Use of Surgical Anesthetics

VETERINARY surgery will never reach a very high standard unless the use of anesthetics becomes more general. The administration of general anesthetics has not increased as it should have done in the veterinary profession during the past decade, and the restrictions on the sale of narcotics has, it is feared, reduced the once liberal resort to cocain to a very low ebb. Confronted with these facts it behooves us to stop and take stock and to ponder over the direction we are drifting. Instead of taking the initiative in the humane handling of animals, we are inviting the public to step in and enact laws compelling us to do our duty to the dumb brutes we thoughtlessly torture. Other countries have done as much and ours is certain to follow unless we ourselves remove the cause for such action. Just how long the public will continue to gaze unmoved upon our writhing patients without objecting on the grounds of cruelty is problematic, but that an objection to the character of some of our surgical work will be made sooner or later is less doubtful. The campaign for less painful surgery might easily be started in each of the state and other local associations by appointing committees to report on the most practical form of pain-alleviating medication for each of the surgical operations, and thus set a standard for anesthesia and at the same time show that we are not unmindful of our duty in this connection. Any hastily enacted law compelling the use of anesthetics is sure to contain unwise provisions which for one reason or other can not be enforced, but a law based upon the recommendations of the whole pro-



Snowbound. A Snowy Day in February at Home of Colonel Merillat, Orville, O.

fession after it has been discussed in every phase for several years will be likely to meet with general approval, and on account of its practicability will be more generally approved if not universally obeyed.

Col. Merillat Believes in Housing His Animals Well.

PINIONING—AMPUTATION OF THE WING

ALTHOUGH little mentioned in veterinary circles, pinioning is a time-tried and effective procedure that should be included in the category of veterinary surgical operations. It has a wide range of application in the bird and poultry industry, and although almost too simple to dignify as a surgical operation, it must be done in a definite manner to assure universal success and to avert complications and fatalities. Its object, of course, is to prevent flight and hence escape from provided enclosures. It is indispensable in the rearing of pheasants, wild duck, wild geese and the other birds of flight now so commonly raised under domestic conditions but which never become sufficiently domesticated to be given full liberty. It is indicated also in domesticated fowls to keep them more securely in the desired confinement.

The operation is done between the ages of five to ten days, at which time the bones are still cartilaginous at the epiphyses. The seat of amputation is the important feature, for if done too low, flight is not prevented, since the flying feathers will grow above the stump. For nearly all birds of flight it is safe to designate a point one-half centimeter above the first articulation to assure that no flying feathers will grow. In domestic fowls the amputation may be done through the articulation itself. There is, however, no particular advantage in selecting the articulation, as the snipping can be done just as easily above the joint at the age mentioned. The snipping is done with sharp and well sterilized scissors, cutting from behind forward. An assistant holds the body of the little creature while the surgeon draws the wing out and snips it off. There is very little bleeding, in fact, often none at all occurs. The application of an antiseptic to the stump must not be omitted, and the subjects should be placed in a clean enclosure.

Majestic Oaks on the Merillat Farm.

RUBBER BANDS IN HEMOSTASIS

As bleeding is one of the chief hazards and annoyances of animal surgery, any artifice that will simplify the technic of its control during operative work will be hailed with delight by those who indulge in refined operations. Elastic bands being in this category should become

popular in our surgical work. They are less likely to slip off; they are easily sterilized; they are tolerated better by the tissues than threads; and when buried there are no knots nor ends to irritate and invite complications. And better still, they need not be handled with the fingers. This latter feature is of great importance in veterinary operations wherein, as everyone knows, it is always difficult to keep the hands clean enough to safely handle ligature material.

To utilize a rubber band to the best advantage it is slipped over the hemostat and then after the vessel is drawn out the band is slipped over with tissue forceps. Providing the forceps are not boiled long enough to destroy the rubber they may be slipped on before sterilizing the forceps. Even in vessels of large size they hold securely and long enough to assure permanent closure of the vessel.—L. A. M.

VETERINARY CORPS, U. S. ARMY

Temporary Rank

Authorized by Congress in Bill Providing 18,000 Officers Until June 30, 1920.

	On Duty April 11, 1920	On Duty May 11, 1920
Colonels	0	0
Lieutenant Colonels	3	2
Majors	28	28
Captains	65	61
First Lieutenants	135	125
Second Lieutenants	73	78
	304	294

RECTO-VAGINAL FISTULA OF MARES

I have a case of recto-vaginal fissure (gelflirted) in a mare that has already been treated by one or two other veterinarians without benefit. What are the chances of recovery if I operate on it?—E.

REPLY: The writer has always taught that this ugly accident is incurable, and in practice has always so acquainted his clients. The reason for taking this flat stand on the subject lies in failure after failure, just as Dr. Ellis has had with his case. No matter what preparation the patient was given, no matter how carefully the parts were prepared, and no matter how skillfully the breach was sutured, the results have always been the same. The stitches did not hold against the forcible movements of the act of defecation. At the A. V. M. A. meeting of 1916, however, Dr. Moore of the St. Joseph Veterinary College gave publicity to a new operation and at the same time spoke in the most optimistic terms possible of the condition. It would be interesting to learn now after four years to what extent the suggestions of Dr. Moore have been adopted by surgeons and what has been their success.

The operation has for its chief objective the prevention of harmful stitch tension during defecation. It also gives the operator better access to the line of cleavage for suturing. The first step and also the salient feature, is an incision through the

sphincter and upward toward the tail. This is a bold through-and-through incision extending right up to the level of the tail. The second step is repair of the breach by suturing the torn edges together. The operation is performed under general anesthesia and preferably on an operating table.—L. A. M.

THROMBUS OF THE AORTA IN A COLT AFFECTED WITH POLYARTHRITIS

A very interesting case simulating navel ill was reported at the January meeting of the *Societe Central de Medicine Veterinaire* by Messrs. Bouchet and Cavel, veterinarians of Chantilly, France. A pure-bred colt of nine months after having partially recovered from a serious arthritis affecting the fetlocks and stifles, was suddenly attacked with a serious and fatal malaise of which diarrhea, total loss of appetite and rapid loss of flesh were the chief manifestations. The autopsy revealed an extensive thrombus of the aorta in the thoracic region. The vessel was hard, cordiform, full, almost completely occluded, and the thrombus was attached to the intima over a distance of twelve centimeters. In the region adjacent, the intima presented numerous secondary foci of epithelial depilations and vegetations betraying the existence of the causative endarthritis. The case is regarded as a secondary infection from an omphalophlebitis.—L. A. M.

THE DISCRIMINATING SCIENTISTS

Scientific associations international in character resuming work suspended during the war and new associations of the same character under organization seem still determined to exclude members from enemy nations, evidently because the animosities growing out of the recent hostilities are too acute as yet in the scientific mind to be set aside even for the sake of the world's progress. Commercialism is less discriminating, since it is seeking to re-establish the pre-bellum status without thought of international hatred. No one will doubt that the existing international hatred will soften sooner or later and that when the modulation has reached a certain stage, members from the enemy nations will again be accepted. Why not now? If the scientific men of the enemy have committed unpardonable sins the ostracism should be perpetual, if not why exclude them for an indefinite period? The truth seems to be that no entire profession is under indictment; complaints are individual and isolated, and so far as the veterinary profession is concerned they are few and doubtless unsanctioned by the majority. There is, therefore, a little savor of peevishness in the temporary exclusion of all enemy scientists from world conferences, and it is hoped that veterinarians everywhere will soon take the broader view for the sake of a harmonious resumption of the interrupted world's work.—L. A. M.

HUGHES OPERATION JUSTIFIABLE FOR "BOG"

I have under observation a very good Belgian show mare that has developed a slight "bog spavine".

She is about three to four years old, and all treatment in the way of ambrocations, absorbents and counter irritants have proved useless.

Is it advisable to operate, that is, with the Hughes operation, and what results can be expected from an operation?—R. F. S., Ind.

REPLY: The operation referred to is always worth trying in obstinate bogs, although sometimes it does not help much. Being an operation attended with no grave operative dangers nor harmful sequelae and at the same time assuring a certain percentage of successes, varying from slight improvement to complete recovery, a practitioner is always justified in recommending the procedure after presenting these facts to his client. The preferable operation is that of ligating both above and below the tarsus. The benefit derived is due to transforming the vein into a fibrous ribbon that gives support to the bulging capsule. Sometimes the cicatricial contraction of this ribbon is sufficient to level up the region entirely. At other times the contraction does not occur as expected, because anastomosing veins prevents the formation of the desired thrombus.—L. A. M.

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

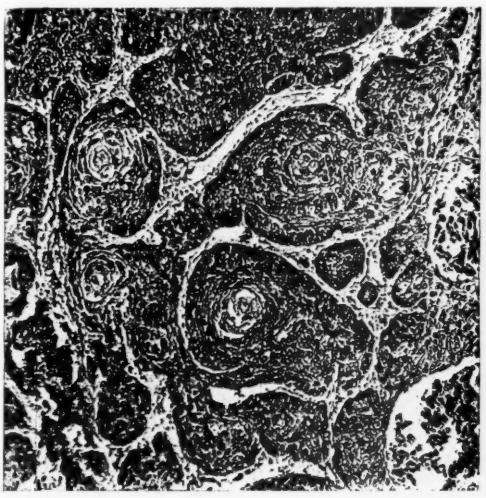
Epithelioma of Facial Sinuses in a Mare*

The subject from which this growth was removed was a cart horse, 20 years of age, used for farm work.

The patient had had a previous attack of nasal gleet, following catarrh, of a few months' duration during 1918, but the gleet did not recur until early in 1919. When first seen, early in March, there was a purulent discharge from the near nostril. After some delay the owner consented to trephining of the frontal and maxillary sinuses, this being carried out under the influence of a local anesthetic (collosol cocaine) on March 27th. No discharge could be obtained from the lower maxillary opening when an irrigation douche was put in at the frontal opening, but one was readily obtained when the douche was inserted in the maxillary opening, through the one in the frontal bone.

On April 26th, under the influence of a general anesthetic, the frontal sinus was again trephined at the site recommended by Siedamgrotzky, i. e., about one-half to three-quarters of an inch in front (below, if the head be held with its long axis disposed vertically) of a horizontal line drawn between the two inner angles of the eye, and 1¼ to 1½ inches from the middle line of the face, and communication between it and that of the nose effected by thrusting a director downward and inward at the deepest point, breaking through the thin plate of bone and the mucous membrane covering it, and enlarging the opening so made by excising with a tenotome, an oval fragment three-quarters of an inch long and three-eighths of an inch wide. Attention was then directed to the original opening in the superior maxillary sinus, and a pair of throat forceps was inserted in the frontal opening and thrust toward that in the maxillary, and vice versa, until the obstruction which was present, and which appeared to be a small polypus, was removed, and direct connection thereby established.

This, however, was of very short duration, and when seen again after an interval of a week no drainage was obtain-



Early cell nests, with processes of tumor cells.

*Jour. Pathol. and Bacteriol., Vol. XXIII.

able from either of the two openings, and the superior maxillary bone on the near side was bulging.

On May 10th the patient was again put under the influence of a general anesthetic, and the frontal sinus again opened a little below the first opening, and a square piece of bone removed.

It was then observed that the entire sinus was completely filled by the growth which was strongly attached to the bony septum that separated the left and right frontal sinuses. Destruction was advised and carried out, and a postmortem examination made.

The left frontal sinus was found to be wholly occupied by the growth, which extended down into the superior maxillary sinus. The fifth upper molar tooth on this side was pushed out of its socket and was carious, and was easily removed by the finger. Inferiorly, the growth was rapidly forcing its way through the nose and underlying palate.

A portion of the growth was retained for microscopical examination and sent to Professor James Ritchie, who examined it, reporting as follows:

"The growth shows the structure of a typical squamous epithelioma of a very cellular character. There are numerous early cell nests, with processes of tumor cells, as shown in the accompanying illustration. The bony laminæ are separated by a myxomatous and fibrillar connective tissue, which is permeated by tumor cells. Numerous polymorphonuclear cells are present in the surface layers."

Owing to the comparative rarity of this class of tumor in this region in the horse the case is placed on record.

J. F. D. TUTT, M.R.C.V.S.
(late Captain R.A.V.C),
Winchester, England.

Lieutenant Sharp, formerly of Charter Oak, Ia., and late of the veterinary corps, U. S. A., will resume practice at Dow City, Ia.

MISSOURI VALLEY MEETING

The Twenty-sixth annual meeting of the Missouri Valley Veterinary Medical Association will be held at the Roland Hotel, Omaha, Monday, Tuesday and Wednesday, July 12, 13 and 14, 1920.

TREATMENT OF PINK EYE IN CATTLE*

In the summer of 1918, I was called to a pure-bred Guernsey herd in which pink eye had suddenly broken out. The disease had not as yet reached the cows on official test, and the owner asked how he might prevent their contracting it. I suggested isolation, but he said it was impossible. I then suggested the use of bacterins but with a guarded prognosis. I gave two mil of hemorrhagic septicemia bacterin to five cows on test as an experiment, leaving the remainder of the herd untreated. Later others began to develop the disease, and I treated the entire herd. Arygol was used in the affected eyes.

Of the animals that received two mil of bacterin, not one developed the disease, though they mingled constantly with the affected ones. Fourteen heifers from Ohio were added to this herd while pink eye was still present. These were given the bacterin treatment and none became affected. In this and one other herd, mentioned later, the economic factor of most importance was the almost total suppression of milk, loss of flesh and possible permanent injury to the eyes, though in all cases the eyes returned to normal.

I saw no more "pink eye" until August 4, 1919, when I encountered the same condition in a herd of 219 cows and calves. The disease had progressed until about 30 cows and calves were afflicted with emaciation and lessened milk supply. Ulcerations of the cornea were prevalent. I gave a mixed bacterin to the entire herd. The bacterin was composed of B. bovisepticus, staphylococcus and streptococcus and Bacillus coli. The same gratifying results were secured as in the former herd where B. bovisepticus was used alone.

On September 10, 1919, pink eye appeared in the largest dairy herd in my territory and adjoining the first mentioned herd. Here I treated 155 cows and calves with B. bovisepticus bacterin with the same results as in the previous herds.

On September 15, of 44 Angus steers being fitted for the International Stock Show, four were found with eyes swollen shut and watery exudate dripping from them. Three showed slight hemorrhages from the nostrils. All of these cases re-

*Read at the 37th annual meeting of the Illinois Vet. Med. Assn., Chicago, Dec., 1919.

covered and no new cases developed in this herd of 190 cows, calves and fat steers, after receiving B. bovisepticus bacterin. In all I have treated 600 animals for pink eye with this method. The mixed bacterin was used on 219 head, while the remainder received B. bovisepticus only.

L. N. MORIN.

McLean, Ill.

"FOOT-EVIL" OR "MUD SORES"

A condition is prevalent here in the Delta, affecting the feet and legs of horses and mules. Laymen usually refer to the malady as "foot evil" and "mud sores," and the popular opinion is that it is caused by mud. Many mules are afflicted within a few days after being taken to the plantations from the sale barns and without having been in any great amount of mud. The condition is prevalent in both old and young animals, and on one plantation there were forty cases out of a hundred mules. Conditions on this place were better as to mud, than the average, the lot being of a sandy nature and practically dry, although the barn was in a rather bad condition from mud and manure. Cases also occurred on this plantation among mules belonging to the tenants and kept at the tenants' homes. These mules were not stabled or fed with the main body at the barn. Hardly a plantation or log camp has escaped, and in some the disease has assumed such proportions as to seriously handicap operations.

The lesions start at different places around the foot or leg. The most common point perhaps is where the long hair is found back of the fetlock and just below the ergot. Cases starting at this point terminate favorably under prompt treatment, but if not treated, rapidly slough and invade the surrounding tissue, including the tendon sheaths.

The next most common point, and by far the most dangerous, is usually about an inch above the coronary band and directly over the extensor tendon. When appearing here, the lesions present a different appearance from those occurring elsewhere, the first thing noticed being a small puffing out of the skin, resembling a blister and about the size of the end of a lead pencil, from which serum exudes, probably described better as a moist papule.

When the lesions appear here, they develop very rapidly, and within a few days may invade practically every sensitive structure of the foot, including the joint capsules. In some cases, the infection, within four days, travels entirely around the coronary band, the moist papules appearing at intervals followed by sloughing of the integument and underlying structures. The prognosis of these cases is very unfavorable even under treatment, as the pus burrows down behind the hoof wall and drainage is difficult. Quite often the periople and coronary structures are destroyed. Not a few animals die from septicemia and some have sloughed the hoof.

When the lesions first appear on the volar or plantar regions they respond to strong antiseptic treatment, provided the necrotic tissue is removed and the recesses are reached. As to the antiseptic, I have secured the best results with iodin injected deeply and with a saturated solution of potassium permanganate on the superficial part of the lesion.

When occurring in front, I have been using rather heroic treatment, even though the infection were just starting, as I found the ordinary antiseptic treatment entirely inadequate. My procedure is to remove all necrotic tissue by incision, then searing thoroughly with the actual cautery. When used early this method stops the infection. When the pus has dropped down behind the hoof wall, a V-shaped portion of the wall is removed for drainage.

If you are familiar with this condition, please advise me. If you want specimens of pus, I will procure them and send them. There have been opportunities (too many) of sending what was left of an entire foot.

This condition is similar, and may be what was known as gangrenous dermatitis among the army horses. If some immunizing agent could be made that would really protect, a great deal of it could be used, as I am sure the whole Delta of Mississippi, Louisiana and Arkansas needs a product of this kind.

REPLY: Since this condition seems to be confined to the South, being practically unknown among practitioners in the nothern and middle states, we would be gratified if some of our southern brethren would discuss the subject, giving informa-

tion gleaned from their experiences in treating this condition.

MALIGNANT EDEMA IN A MULE —RECOVERY

The following case was brought to me for treatment June 21, 1919. As most practitioners possess a Hutyra & Marek, in which a most excellent description of this disease appears, I will not go into detail as to its various manifestations, history, occurrence, pathogenicity, symptoms, treatment, etc., but will discuss it only as it presented itself in this particular case.

Subject: Five-year-old mare mule.

History: Earlier in the spring, the shoulder was injured by a collar, producing a collar bruise, which was treated by the farmer by blistering for a couple of months. This enlargement was later incised and an escharotic applied to the wall of the cavity. Aftercare was not of the best. Later an edematous swelling developed, involving a large area about the original wound, from which dirty brown fluid mingled with disagreeable smelling gas bubbles oozed.

Symptoms: When the animal was brought in, she had a temperature of 104.5° F., pulse accelerated and weak, respiration accelerated and short, appetite diminished. The skin about the original wound was necrotic and sloughing away from the normal skin and extending to below the point of the shoulder joint. Crepitation was present, accompanied by the dirty brown fluid mingled with disagreeable smelling gas bubbles, oozing from the wound, described above.

Diagnosis: Malignant edema.

Treatment: Free excision of all necrotic tissue, which weighed approximately five pounds, and left a wound eight by thirteen inches. Intramuscular injections of potassium permanganate were made into the tissues surrounding the wound, for the first few days, then the wound was treated with iodoform and oxyborine powders. Following this, a dressing powder consisting of boric acid, carbolic acid, camphor, zinc oxide and charcoal was used until the wound was dry and healing nicely, when a vulnerary balsam was used until the wound was entirely healed.

Internal treatment consisted of soluble iodin and mucoseptone for the first few days, then tonic powders were used for about three weeks. Within twenty-four hours after excision of the necrotic mass, the temperature gradually declined, appetite returned and the animal made an uneventful recovery in about six weeks. Excised muscle and tissues have been regenerated and the mule suffers no inconvenience as a result of the disease.

WM. C. MCCONNELL.

Holdenville, Okla.

PARAFFIN OIL BEST REMEDY FOR IMPACTION

In the April number of the Journal I note an article signed A. A. A., Wisconsin, describing a case of constipation or impaction.

In this locality, alfalfa hay is about the only hay we have, consequently the horses are fed on it the year around. Horses that are not worked have access to a rack full of hay in the corral and load up on it. We are taught that alfalfa hay is slightly laxative, but it does not always prove so.

One gets a call to come out and see some horse that seems a little colicky. The history will be about as follows: The animal goes over in a corner, lays down, gets up, turns around and lays down again, maybe rolls once or twice, gets up, and goes to eating again. In a short time he is in pain again.

Examination will probably show that respiration is somewhat rapid, temperature normal, pulse a trifle fast, peristalsis nil. One usually makes up his mind that he has a case of impaction. But where? Rectal examination reveals nothing.

My treatment for these cases is as follows: I pass the stomach-tube through the left nostril and pump in one gallon of paraffin oil, to which has been added one-half ounce turpentine and one-half grain of strychnin. In six hours the dose is repeated. I have given a full grown horse as much as five gallons to get results and with no bad results following, as this oil goes through the intestinal tract unchanged, only softening up the impacted mass. The turpentine I give as an anodyne, intestinal antiseptic and anti-ferment: the strychnin as a stimulant to the intestines as well as a general stimulant.

Since using this line of treatment, I have had a great deal better success. I

do not think arecolin has any place in these cases, for in using it, it is either kill or cure, and in most cases it is kill, as a postmortem examination usually shows a rupture.

Dr. Merillat is right in saying, a pint of paraffin oil is insufficient. At least a quart or so would be insufficient here, but where horses are fed prairie hay, or timothy, it might be sufficient.—C. H. G., Colo.

SUGAR TREATMENT FOR REVERTED UTERUS IN EWE

In the January Journal, I note Dr. Ray Powers' request for a successful treatment for eversion of the uterus in sheep. The following report of a case I recently attended may prove of some value to him.

On March 29, I received a call to come at once to attend a ewe that had lambed the night before and had a "big bunch" hanging down behind. On arrival, I found the ewe suffering from eversion of the uterus, accompanied by inflammation and some swelling.

While the owner was getting a pail of hot water, I administered fluid extract hyoscyamus 51, and placed the animal on her back on a horse blanket, the sacral region resting on a bag of oats. With the owner holding the hind feet, I cleaned the uterus with a 1.50 solution coal tar disinfectant. After thoroughly disinfecting my hands in the coal tar solution, I applied the sugar treatment, massaging until the uterus was sufficiently reduced. The sugar was then washed off with the solution, and grasping the uterus between the thumbs and forefingers about one inch from the vulva, it was returned to place by pushing gently, changing hold frequently. Again washing my hands and right arm in the disinfectant, I put my hand in the vagina and doubling up my fist, pushed the uterus in place and carefully manipulated the walls into place with my fingers. Immersing a needle and silk thread in the disinfectant, I took two stitches through the lips of the vulva, leaving the lower part open for urination and finished by washing the vulva with 1:25 coal tar solution.

On regaining her feet, the ewe searched the flock for her lamb and then went to the feed rack and began to eat.

I ordered the ewe and her lamb removed to themselves in order to keep her quiet and from worrying about her lamb. I left 3II hyocyamus fluid extract with instructions to give one-half if she showed any signs of straining, the remainder an hour later if straining was not completely stopped.

The owner called me on the phone the third day, and said the ewe had been straining some the day before, and he had given both doses of hyocyamus. I told him to leave the stitches in another day.

In order to complete my record of the case, I phoned to him yesterday (April 7th) and he said the ewe was all right in every way and was doing fine.

Maybee, Mich. R. P. BARNUM.

ONE HORSEPOWER FAILED TO DELIVER A TWO-HEADED CALF

The accompanying illustration shows a two-headed calf I delivered a few days ago. This calf was presented on its back, hind legs first. The owner attempted to deliver it by hitching a horse to it, but couldn't move it. I was called and amputated all the protruding part of the calf, returned the remainder to the uterus and straightened out the heads, after which it

was delivered very easily. The heads were perfect, with about three inches of neck on each. These necks united and formed the main neck. There were two pairs of lungs and two hearts.

J. FRED STONER.

Momence, Ill.

EVERTED UTERUS RESULTS FROM UNSKILLED REMOVAL OF AFTERBIRTH

I was called to treat a Jersey cow weighing about 700 pounds, in which the eversion of the uterus was complete, caused by the owner removing the placenta. He and a neighbor had worked from one p. m. to five trying to replace the organ. The condition of the uterus when I called at six o'clock may be imagined. With an assistant keeping warm antiseptic solution constantly flowing over the uterus during the entire operation, I succeeded in replacing it; the operation requiring about two hours. Laxative medicine was left, and no other treatment was given except careful dieting. A prompt recovery followed.

LOOKS AS IF H. S. WILL HAVE TO TAKE THE BLAME

I do not know whether other practitioners have the same experience as I do or not. I am constantly running upon something new to me.

On January 31st, of this year, I had two cases of the same nature, only some distance apart. The first one was a bay gelding, six years old, brought to my hospital by the owner, who said the horse needed his teeth fixed. I found his teeth in perfect condition, but when I opened his mouth, a thick, ropy amber-colored saliva ran out.

I thought he had a little cold, as the owner said that he had worked him the day before, and as the horse had not worked for sometime he warmed up easily.

His temperature was 100 degrees and his pulse was 38. Pressure in the region of the larynx caused him to turn his head as though his throat were a trifle sore. The owner said that the animal had refused his feed that morning, but the night before he had eaten all of his feed and seemed to relish it. The owner seemed to think that the horse would be all right if he gave him a good warm mash, and he did not want any medicine for him. He paid me for looking him over and went home, and I heard no more of him until seven o'clock that evening, when the owner came to the office and told me that the horse was discharging at the nose and pressure about the throat caused him to cough but he seemed to breathe normal.

I gave him a cough mixture and a throat liniment and advised him to steam him and put a good blanket on him, and if he was no better next morning, to call me. He did, but to my surprise said that the horse was dead and he wanted me to come out and hold a postmortem examination. So when I thought they had the skin off and place dug to bury him in, I went out as requested. The owner told me he applied the liniment about 9 o'clock, and that the horse breathed a little hard. He just got back into the house when he heard a noise in the barn, and by the time he got to the barn the horse was deader than hay. From the time that this horse was first noticed sick, he never lay down until he died.

Postmortem findings: Along down the neck around the shoulders and back, it seemed very bloody and as though he was terribly bruised. After the muscles were exposed to the sun and air a short time, they turned almost vermilion red. The abdominal cavity was normal; the left lung seemed to be inflamed very little. The owner told me that this horse had the best of timothy hay and four ears of corn twice a day.

My second mystery was a four-year-old mare, weighing about 1,000 pounds, and quite thin. She had a temperature of 100 degrees, pulse 40, ropy saliva exuding from her mouth, similar to the previous case. There was also a slight discharge from both nostrils. Her throat seemed to be sensitive to touch, so I left some liniment and instructed my client to steam her well and I would call the next day. This was about two p. m.; at five they were preparing for a funeral. This animal stood up until five minutes before she died. The owner told me that after the skin was removed, she was in the same condition as the previous case described.

I was invited to attend the funeral, but was too busy to go. This man had plenty of good feed in his barn and the barn was good and warm. I am puzzled to know what these two horses died of. I would be pleased to hear from some who have had a similar experience.

H. H. Guy, D. V. M.

Petersburg, Mich.

COMBINED TUBERCULIN TESTS*

Traum and others have demonstrated that any of the methods of tuberculin testing (subcutaneous, intradermal or ophthalmic) will fail to detect an important percentage of tuberculous animals. They have further demonstrated that tuberculous cattle, while giving negative results to one form of tuberculin application, may give positive results to another form. Therefore, the combining of two or more tests has been suggested. The combination which appears most effective is the sensitized ophthalmic with the intradermal test, at the same time making a record of the thermal reaction resulting from the latter injection.

THERMAL REACTION FOLLOWING INTRADERMAL INJECTION OF TUBERCULIN*

Investigations of this station have pointed out that the intradermal injection of tuberculin in suitable doses gives rise to a thermal reaction similar to the one obtained by the subcutaneous method. The intradermal dose used by the California state veterinarian in official testing, 0.2 c.c. of 5 per cent solution of alcoholic precipitated tuberculin, is sufficient to bring forth this result. The practical application of these observations is evident. One may, by one injection, make use of two diagnostic manifestations of tuberculin application, namely, general reaction as indicated by rise in temperature and a local reaction. The San Francisco County Medical Milk Commission has recently adopted this method of testing for additions to herds producing certified milk. The subcutaneous test was formerly used.

When only one observation can be made, we have made it at 72 hours, others prefer 96 hours. Some reactions do not occur until after the seventy-second hour, but we are not satisfied that there is not an equal or larger number of cattle in which definite positive reactions have been present but disappeared before the ninety-sixth hour.

†Report, University of California Experiment Station.

Well-marked intradermal reaction. This animal when posted had extensive caseocalcareous deposits in the postphargyngal lymph-glands, which were greatly enlarged.—Photo by Ackley.

IMMUNITY TO HOG CHOLERA LASTING

A series of recent experiments on duration of immunity to hog cholera following simultaneous inoculation of young pigs, supports the conclusion that the protection is lasting. The investigations were conducted at Ames, Iowa, by specialists of the United States Department of Agriculture.

Altogether 171 pigs, inoculated when a week to six weeks old and exposed to hog cholera, at times varying from 5 months to 9 months and 26 days later, were found without exception to be immune to that disease.

Three of the pigs, however, died during the period of exposure from causes other than hog cholera.

There was no apparent ill-effect from the simultaneous inoculation in any of the pigs.

There was no difference in the immunity of pigs from immune and non-immune sows.

Pigs that were approximately one week old received 10 cubic centimeters of anti-hog cholera serum and ½ c. c. of virus. Pigs that were three weeks old or more received from 15 to 20 c. c. of serum and from ½ to ¾ c. c. of virus.

Immunity was tested by injecting 5 c. c. of virus into the animals when they had

attained weights exceeding, in many cases, 200 pounds. None of the hogs contracted cholera. The experiments appear to disprove assertions by some observers that simultaneous inoculation of young pigs is not lasting and that immunity disappears at stages of growth variously placed from weaning time up to 50 or 60 pounds in weight.

NO STATE VETERINARIAN IN WASHINGTON

In your April issue, I notice that you give the name of Dr. S. B. Nelson as State Veterinarian of Washington. You are evidently not keeping very much up-to-date on veterinary matters here in the Northwest, for the State of Washington has had no state veterinarian since 1913. Veterinary matters in this state are handled by the State Department of Agriculture, and matters formerly handled by the state veterinarian are chiefly under the jurisdiction of the Chief of the Division of Dairy and Livestock. Dr. L. C. Pelton, of Olympia, now occupies this position, succeeding Dr. R. J. Donohue, who resigned on March 20.

Centralia, Wash. CLIFF ACKLEY.

REPRODUCTION IN THE MULE

Three months after a mare mule was known to have been served by a male mule, I was called to see her by the owner who stated that her intestines were protruding and he wanted me to replace them.

When I reached the place I found about twenty-five men waiting to see the procedure. As the mule was quite fractious it was necessary to use hobbles and cast her. I found about twelve inches of the placenta protruding. I proceeded to extract it gradually, but it seemed to be fastened and would not come away. With my hand well anointed with carbolized vaseline, I passed it through the vagina to the mouth of the uterus. It was very difficult to enter the mouth of the uterus with my finger. I inserted a small piece of cotton saturated with belladonna into the mouth of the uterus and left it there fifteen minutes, after which I manipulated my fingers around in the uterus until I found the fetus. After covering it well with vaseline, it came away without any trouble. After being released the mother walked away and began to eat grass as though nothing had happened. There was no hemorrhage or other signs of abortion.

The fetus was well formed except that the ears were small and the head was about three times the normal size. It weighed about four pounds. Hair had formed on the lips and the end of the tail. I have the fetus preserved in alcohol. I would be glad to hear from others who have had a similar experience.

J. C. ELLIS.

Norwood, La.

SOUTH CAROLINA HAS A VETERINARY PRACTICE LAW

Please allow me to correct your answers to "F. X., Wisconsin," and "F. K., Kansas," in the April issue of the Journal. At the recent meeting of our state legislature we were successful in securing a law regulating the practice of veterinary medicine in South Carolina, and we believe we have a good one, too. Our success in securing the measure is largely due to the efforts of the live stock men of the state in our behalf, after a continuous ten-years' fight by the veterinary profession.

For the information of those who are looking toward this state for a location, and they are here for the right men, it will be necessary to pass a satisfactory examination before the Board of Examiners, of which Dr. W. A. Barnette, Greenwood, S. C., is secretary and treasurer, and he will gladly furnish any one with such information as he may desire.

Dr. Benjamin McInnes of Charleston is the president of the Board, and the other member is Dr. M. R. Blackstock of Spartanburg.

Dr. R. O. Feeley is our state veterinarian, with headquarters at Clemson College.

F. P. CAUGHMAN, B. S., V. M. D.
Sec., S. C. Vet. Asso.

An estimated loss of $7,000 was recently sustained by Dr. Roe King, of Sheridan, Ind., when his home and veterinary hospital were destroyed by fire. The fire started in the hospital and spread to the home near by. Three automobiles, a Jersey cow and a bull dog and a large flock of chickens were destroyed. It will be remembered that Dr. King was only recently released from military service.

Department of Live Stock Poisoning

By L. H. PAMMEL, Ph. D., Ames, Iowa
Professor of Botany, Iowa State College

Readers are urged to take advantage of the opportunity offered by Dr. Pammel, for the identification of specimens of supposedly poisonous plants. Two good-sized specimens, carefully packed, should be sent to him direct, with such history as may be available. Simply mention that you are a reader of the AMERICAN JOUGNAL OF VETERINARY MEDICINE and no charge will be made for this service.

Photographs of Poisoned Animals Wanted

It is important that I have photographs of animals poisoned or suspected of being poisoned. Therefore, will not the readers of the Journal send me such photographs with statements regarding the plants which caused the poisoning?

The writer is preparing a new edition of the "Manual of Poisonous Plants," and such material will prove useful for this work. Full credit will be given. Address communications to L. H. Pammel, Ames, Ia.

Arrow-Grass Poisonous

I have just received from Professor M. R. Miller,[1] a bulletin on arrow-grass, a new stock-poisoning plant. The bulletin records experiments conducted by C. E. Fleming, N. F. Peterson, M. R. Miller, Drs. L. H. Wright and R. C. Louck of the Nevada Agricultural Experiment Station on arrow-grass (*Triglochin maritima*), a member of the family *Juncaginaceae*, related on the one hand to the water plantain family *Alisanaceae* and on the other to the pondweed (*Naiadaceae*). Arrow-grass, of course, is not a grass. It is a perennial with rush-like fleshy leaves. The plant grows in marshes, resembling a grass, leaves sheath at the base, flowers small, greenish in a spiked raceme. The plant is common in saline soil across the continent, perhaps most common in salt marshes of the Atlantic coast. It is, however, also common on the Pacific Coast and especially in saline soil in the Salt Lake Basin and the alkali lake region of the west. The authors state that the bunches are sometimes twelve inches wide or in irregular patches ten to twenty feet or more across.

This plant has never before been suspected of being poisonous. It is readily eaten by animals. The bulletin states:

"An air-dried sample of the plant (*Triglochin maritima*) used in the feeding experiments was examined in the station laboratory and was found to possess cyanogenetic properties, i. e., would yield hydrocyanic acid (prussic acid) upon suitable treatment.

"That this might be expected was, in a measure, suggested by the symptoms observed in the feeding experiments. In the literature it appears that Greshoff found from 0.02 to 0.6 per cent of hydrocyanic acid in *Triglochin maritima*. Later, Blanksma in working with the same plant, found hydrocyanic acid in amounts varying from 0.056 to 0.184 per cent.

"In the plants known as cyanogenetic plants, substances have been found in which hydrocyanic acid is in combination with other compounds. As an example of such compounds may be cited amygdalin, a compound which will yield hydrocyanic acid and benzaldehyde, found in the bitter almond. Compounds of this sort may be made to give up their hydrocyanic acid by the action of suitable reagents, such as by the action of acids upon amygdalin. Another method of breaking off the hydrocyanic acid is by the action of certain ferments. Almost

[1] C. E. Fleming, N. F. Peterson, M. R. Miller, L. H. Wright and R. C. Louck, Bull. Nevada Agr. Exp. Sta., 98 : 1—22, *pl.* 1-10, January, 1920.

invariably the cyanogenetic substance is found to be accompanied in the plant by a ferment most suitable for that substance. When the cells of the plant are broken, the ferment has opportunity to act upon the hydrocyanic acid holding compound and the acid is liberated.

"In explaining such a state of affairs it is necessary to consider all of the possible factors which contribute to the action of these compounds. Auld has pointed out that under digestive conditions cyanogenesis is likely to be inhibited. He shows that the presence of acids, alkalies, salts, cellulose and glucose all tend to prevent the liberation of the poison, and that in the cases of feeding in which poisoning occurs, it is likely that there is some element which interferes with the inhibition which would normally take place. The possibility of the formation of hydrocyanic acid in the food before feeding is very likely in cases in which the feeding stuff is manipulated or prepared before administration. In the case of green food, only the rupturing of the cells is sufficient to produce the free poison, and in the case of the dry material, which is generally more or less broken up, it is only necessary to introduce moisture to produce the free poison.

"The greater part of arrow grass consists of leaves, the flower stalk making only a small portion of its total weight. The leaves have been conclusively proven to be poisonous. We have not determined whether the flower stalks are poisonous because they are more or less tough and unpalatable and make up only a minor part of the total weight of the plant. The roots are so firmly held down by their fibrous growth that there is little or no chance of their being eaten.

In the feeding tests recorded in the bulletin, all the animals were fed the fresh, green leaves except a single sheep, weighing seventy pounds, which was fed three fourths of a pound of the green fruits without results:

"As a result of the 20 feeding tests, 7 sheep were poisoned, 5 of which died. The weight of green material required to make a sheep sick or to kill it varied from 1.5 pounds to 4.5 pounds, the average fatal dose being approximately 2.4 pounds. Because of the extremely irregular way in which plants containing hydrocyanic acid act on animals, it would be difficult to state accurately just how much of the plant is required to kill a sheep or to make it sick."

It was shown by the feeding experiments that the feeding of the plant, cut during early summer and fall (and the plant was found to be toxic during the entire season) caused injury. The symptoms of poisoning are described as follows:

"The first symptom noted was abnormal breathing, usually very rapid, often as high as 150 per minute, in sheep. In other cases it was slow and deep. As symptoms of poisoning developed, the animal breathed quite freely through the mouth, often with the tongue hanging out. This abnormal breathing was often accompanied by trembling or jerking movements of the muscles. In severe cases these jerking movements would develop into spasms or convulsions. After these started the animal would lie on its side panting through the wide open mouth. From the time the animal went down until partial recovery or death there would be a series of convulsions at short intervals. Several of the animals vomited just before death, drawing part of the regurgitated material into the lungs, which may have hastened death.

As to prevention the authors state:

"With arrow-grass, as with other poisonous plants, it appears that not much can be hoped for in the cure of animals already poisoned, but that a good deal can be done to prevent poisoning. Wet meadows, where arrow-grass is very common, should not be cut for hay. However, where the plant is distributed in small clumps, rather uniformly, and is not very abundant there is little danger. The largest clumps should not be cut, or, if cut, should not be loaded on the wagons and should be burned when dry. Animals should not be put on pastures containing an abundance of arrow-grass when they are very hungry. In some cases, moreover, portions of pastures and meadows where arrow-grass grows in great abundance should be fenced and left unused. By these methods it should be easy to prevent losses due to this poisonous plant.

The bulletin is in every way a most excellent one, and there is a promise of

some more good material along this line, by the same authors. The bulletin has some excellent illustrations of the plant and the poisoned animals.

Poisonous Fungi on Paspalum

The Veterinary Record[1] publishes the following from *La Clinica Veterinaria* in regard to poisoning from a fungus on *Paspalum notatum*. "In May, 1916, at the Bacteriological Institute of the National Department of Hygiene, F. Rosenbuch and J. Zabala had occasion to observe in the province of Buenos Aires a hitherto unknown bovine disease characterised by trembling and falling of the animals and sometimes accompanied by rapid death. The disease is known by the names of *"tembleque"* or *"chuco."* Study of the blood affected animals excluded the presence of micro-organisms, and negative results of injections of such blood both in cattle and other species of animals likewise exclude the idea of a parasitic origin of the disease. Rosenbuch and Zabala were led to the opinion that the disease was produced by intoxication due to an unknown cause.

"The correctness of this diagnosis is now demonstrated by examination of the flora of the pastures where the disease has appeared. The pastures abounded with the grass *Paspalum notatum* Flug., which is perfectly innocuous when sound, but is poisonous when attacked by a certain fungus. The grass attacked by this cryptogam, the species of which is not yet determined, is however, innocuous to horses.

"On that account Rosenbuch and Zabala advise, as a preventive measure, that horses should be put into pasture before cattle are placed there. When that is impossible, they advise passing a rake over the pastures, as the affected portions of the grass, being much more easily detached than the sound ones, are thus made to fall. As curative measures, they recommend jugular bleeding, subcutaneous injections of eserin and pilocarpin, and purgatives.

"The same disease has been observed by Juan N. Murtagh in the provinces of Buenos Aires and Santa Fe, where it affected from 30 to 50 per cent of the cattle.

[1]Veterinary Record, 30: 429.

Claviceps Paspali Poisoning in Cattle

R. Paine reports on the poisoning of ergot growing on *Paspalum dilatatum* in South Africa.[1] "So far I have only seen bovine females affected, no males having access to the affected grass, and in one case where calves were running with the cows, they showed no symptoms. Upon one farm some fifteen head had been grazing on affected paspalum all the summer, and when fifty fresh animals were placed in the same camp they developed symptoms within two days, although the original fifteen which were with them remained healthy. The conditions of age, sex, etc., were identical in each herd.

"Symptoms. The cases may be well described by stating that the animals appear to be heavily drugged or intoxicated. They stagger and sway, especially behind, the eyes are protruded and staring, breathing hurried; there is muscular twitching, particularly over the shoulders. Sometimes the animals may be inclined to charge, some cases are totally unable to rise for two or three days.

"The animals continue to feed and ruminate, and in no case does abortion occur. The milk supply is arrested for the time being."

Berberine in Philippine Plants

A. H. Wells reports on the physiologically active constituents of certain Philippine plants.[1] He has found berberine in more than thirty species of plants in twenty-three genera. Wells reports its occurrence in Arcangelisia flava, a coarse woody vine of the Moonseed family (*Menispermaceae*). The Cassia siamea, a member of the pulse family (*Leguminosae*) is commonly planted as a shade tree in Manila. The alkaloid found in this plant is poisonous to guinea pigs. Cassia is related to our partridge pea and senna. The "toot plant" of New Zealand, known to botanists as *Coriaria intermedia*, contains a very poisonous glucoside, 100 kg. of the fresh material giving 69 g. of crude product which can be extracted by water. Two cc. of the plant extract injected intraperitoneally into a 700 g. guinea pig caused death in 30 minutes. The "toot plant" is very poisonous to sheep and cattle in New Zealand.

[1]The Veterinary Record, London, 30: 128.

[1]Philippine J. Sci., 14: 1-6 2 pl. Abstract L. W. Griggs, Chemical Abstracts, Jour. Am. Chem. Soc., 13: 2930-31.

Pathogenic Bacteria and Protozoa

(Continued from page 268)

appears to as nearly fit its field as it is possible for the printed page to do. It is strictly medical and does not give consideration to purely veterinary problems, although tuberculosis, glanders, actinomycosis, favus and of course, the pyogenic infections common to both man and lower animals, are discussed.

WILL HELP FARMER AND ALSO AID IN DISEASE FIGHT

Much gratification is expressed by farmers over the action taken by the Nebraska Veterinary Medical Association, in meeting here recently, when that body went on record as favoring a more liberal application of the law applying to payment of indemnity for loss of cattle from tuberculosis. This they supported as a just movement and at the same time they saw in it an opportunity toward an end, namely, that of aiding in stamping out this disease. The resolution follows:

Whereas, The present law which provides an appropriation for the payment of indemnity for tuberculous cattle does not permit the payment of such indemnity for reactors unless such herds are under federal and state supervision for accreditization, and

Whereas, It is our belief that it was not intended that this law should be so partial as to deprive the owners of dairy herds and others whose herds cannot be tested on the accredited plan from receiving indemnity for tuberculous cattle found in their herd

Be It Resolved, That we, the Nebraska Veterinary Medical Association, in convention assembled, recommend that proper steps be taken to provide as sufficient fund for the indemnifying of owners of cattle slaughtered by order of the state, as the result of being tuberculous, believing this to be a most important, fair and impartial step in the successful eradication of this disease.—*Kearney (Neb.) Daily Hub.*

MINERAL MATTER AND MILK

Experiments conducted by the Bureau of Animal Industry, United States Department of Agriculture, with dairy cows, are showing an important relation between milk secretion and certain mineral substances. Feeding compounds of phosphorus and calcium have resulted in a decidedly beneficial effect on the milk flow in both quantity and fat content.

It has been shown also that a deficiency of phosphorus in dairy rations has a detrimental effect on milk secretion of cows and growth of calves. A remedy was found in the addition of sodium phosphate to rations deficient in phosphorus. The work is being continued.

BACILLARY EDEMA IN FOWL

(Continued from page 250)

In agar plates culture media dew-drop colonies are noted. Napiform liquefaction in gelatin coagulates milk with no tendency to digestion of the curd. It stains a canary yellow on potato and gives off a sweetish, sickening odor, which odor is also noted to be given off from the sores of the bird. The thermal death point is about 57° C.

Injections of pure cultures subcutaneously into rabbits always produce abscesses with no immediate constitutional disturbance and from which the organism is isolated in pure culture. Injections of pure cultures of the organism subcutaneously in a fowl always cause acute swelling with suppuration of the local injected part. Wounds of fowls inoculated with pure cultures may cause typical sores.

The disease is of a local nature and the organism cannot be isolated from the heart blood, liver, spleen or kidneys of a bird that has died of the disease.

We have failed to find any description of a similar organism in the literature at hand. Since the organism was first isolated by us from the wound of a fowl we propose for it the name *Bacillus Vulnaris Avium*, or bacillus of the wound of the chicken.

Iodin which has been so useful in our hands in controlling suppurative processes of the fowl, has had no beneficial effect in the treatment of these sores or of edema where no sores have appeared.

THE CATTLE TICK SWEEPS ONWARD IN AUSTRALIA

A comparison is made between the tick infested areas of Australia and the United States, of which maps are given. Whereas in the latter country the tick (*Boophilus annulatus*) is being steadily pushed back, in Australia it has been gradually spreading. In Queensland the losses from tick fever alone have been estimated at $35,000,000.